

Department of Mines & Energy

Annual Report

January 1, 1981 to March 31, 1982



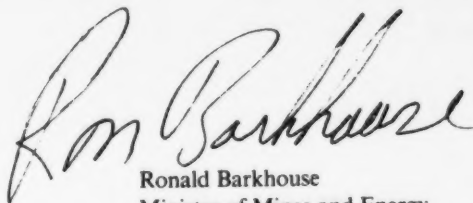
Nova Scotia



**PROVINCE OF NOVA SCOTIA
DEPARTMENT OF MINES AND ENERGY**

To His Honour
The Honourable John E. Shaffner
Lieutenant Governor of the Province of Nova Scotia

The undersigned has the honour to submit herewith the Annual Report on Mines and Energy of the Province of Nova Scotia for the period January 1, 1981 to March 31, 1982.

A handwritten signature in cursive script, reading "Ron Barkhouse". The signature is written in dark ink and is positioned above the printed name and title.

Ronald Barkhouse
Minister of Mines and Energy

Halifax, Nova Scotia
September 31, 1982

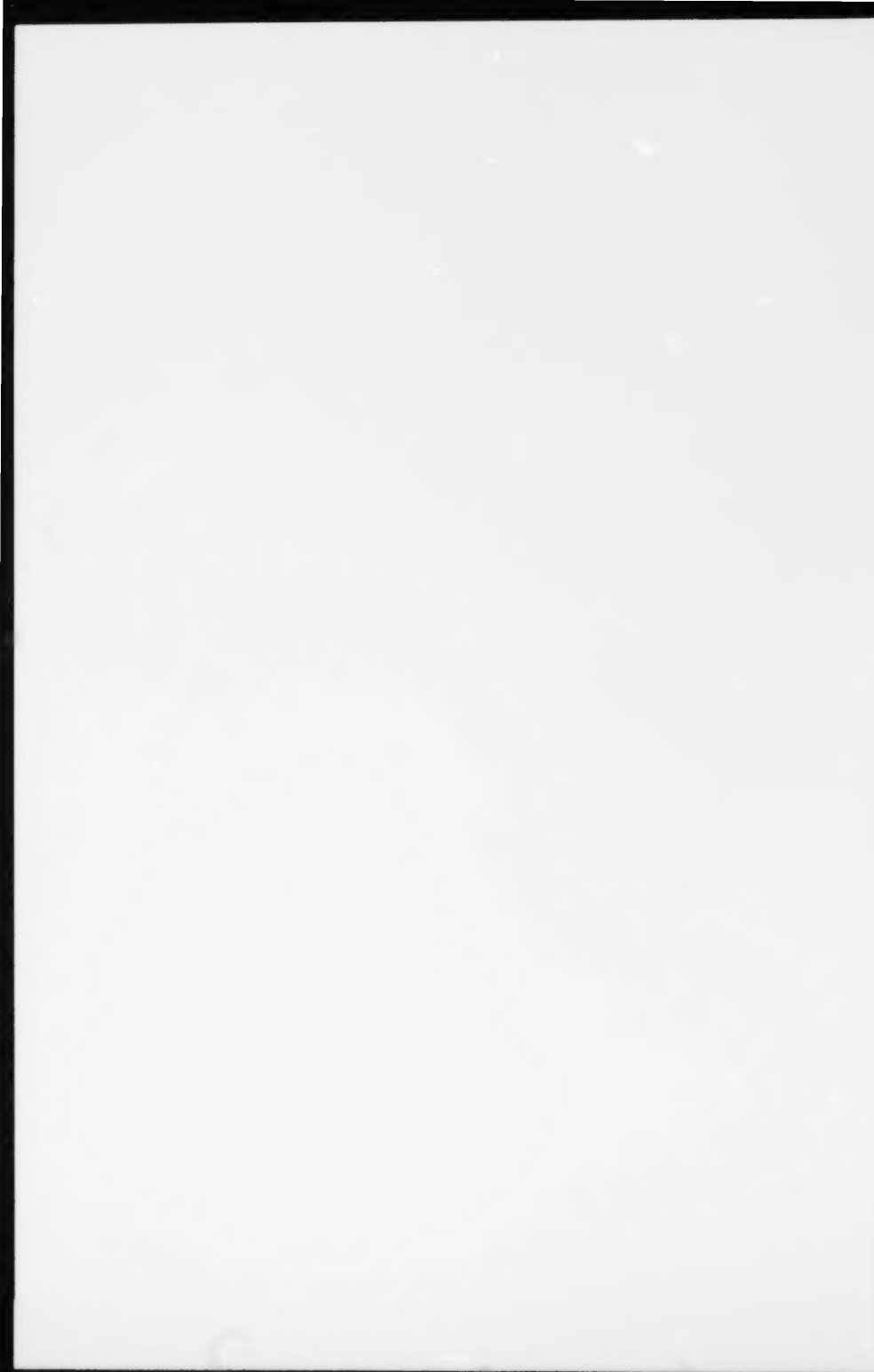


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DEPUTY MINISTER'S REPORT

John J. Laffin, P.Eng., Deputy Minister

The 1980's can be a decade of unprecedented growth and opportunity for Nova Scotia. The Province's energy and mineral resources have the potential of being key forces behind this growth. This resource development activity is already underway, and as a result, the Department of Mines and Energy has assumed increasing responsibilities and a greater workload over the last fifteen months. This is a trend that is sure to continue in the future.

The Department of Mines and Energy acts on behalf of the Provincial Government in energy and mineral issues as owner, planner and regulator. As owner, the Department analyzes exploration and development proposals, assigns leases for exploration and development projects, and sets the terms of those rights, covering items such as royalties and expiry dates. As planner, the Department, in cooperation with other government departments and groups in the private sector, prepares for the impacts of major energy and mineral developments, both inside and outside the Province. As regulator, the Department monitors the construction and operation of energy and mineral projects to ensure that they meet accepted standards of safety and performance.

In 1981, the mineral sector of Nova Scotia, like that in the rest of Canada, felt the effects of the current economic recession. Nevertheless, production levels were maintained in the traditional commodities: coal, gypsum, salt, and aggregates. The overall value of production was about \$260 million, slightly above the previous year. This was achieved despite a major work stoppage in the coal industry and suspension of production at the Province's two base metal mines (Yava and Gays River).

Mineral exploration continued at a high level in 1981, but dropped considerably in the first three months of 1982. This was due to the continuing decline in the metals market, the decision by many oil companies to withdraw from the mineral industry, and the current moratorium on uranium exploration. Also, the current economic conditions have resulted in the postponement of a development decision on the major tin deposit at East Kemptville, near Yarmouth. However, interest in the long-term potential for mineral development in the Province is still evident, as indicated by the formation in 1981 of a Chamber of Mineral Resources of Nova Scotia.

A significant event took place on December 1, 1981 when an agreement was reached with the federal government on the implementation of a \$3.9 million program of geological and mineral deposit studies. The agreement is

for a period of two years with the federal government providing \$2.7 million and the provincial \$1.24 million. It is unique since we are currently the only provincial government with a minerals agreement with the federal government.

Over the last fifteen months, a number of significant events have occurred in the energy field in Nova Scotia. In 1981, the Province's overall dependence on oil was reduced to approximately 73 per cent of total energy consumed, while dependence on oil for electrical generation was reduced to approximately 40 per cent, reflecting the impact of our on-going conservation and oil substitution programs. Many of these programs are cost-shared with the federal government through agreements with the Departments of Energy, Mines and Resources, and Regional Economic Expansion.

Coal-related activity continued at a high level with new exploration programs (Petro-Canada, Brinco/Suncor); demethanation and methane extraction projects (Noval Technologies); mine construction, expansion, and modernization (Cape Breton Development Corporation and Novaco Limited); and coal research and development initiatives (Cape Breton Coal Research Laboratory, Committee on Atlantic Coal, Nova Scotia Research Foundation Corporation, coal-water mixture fluidized bed combustion, and coal liquefaction projects).

The timetable for oil and gas development off the coast of Nova Scotia was improved by the signing of the Canada-Nova Scotia Agreement on Offshore Oil and Gas Resource Management and Revenue Sharing in March 1982. The encouraging test results from Well B-43 (the second appraisal well on the venture structure), and the increasing number of rigs drilling and planning to drill has produced much optimism about Nova Scotia's offshore resources.

The Department spearheaded the preparation and presentation of the Province's arguments for gaining access to natural gas from western Canada through the Trans-Quebec and Maritimes (TQ&M) pipeline. In its submission to the National Energy Board on the TQ&M pipeline, the Province argued that the design of the pipeline should take into consideration the future availability of natural gas from our offshore. The Department has also been actively involved in preparing and presenting Nova Scotia's case for selection of Melford Point (Strait of Canso) as the southern terminus for the LNG Arctic Pilot Project.

In addressing the energy and mineral opportunities and challenges facing Nova Scotia, the Department of Mines and Energy is fortunate to have a

highly qualified and motivated staff whose efforts have resulted in this report. In expressing my appreciation to the staff for their efforts in the past year, I also wish to thank the minister for the advice and thoughtful consideration he has provided to the Department.

I must note with sadness the death in 1981 of Mr. Frank Shea, former Director of Mineral Development and a long time member of the Department.

Nova Scotia, like the rest of the country, is affected by a downturn in national and international economic activity. However, our energy and mineral resources, combined with the related attributes of a skilled workforce, a well established infrastructure, and a prime geographic location, continue to make our Province a very desirable location for mineral and energy development.

ORGANIZATION AND PERSONNEL OF THE DEPARTMENT

The Department of Mines and Energy is organized into six divisions. Together, these divisions support the Department's objectives for the optimum development of energy and mineral resources and the attainment of a secure, efficient energy balance for the Province. Individually, the Divisions have the following mandates and duties.

Mineral Resources Division: responsible for issues involving assessment of the Province's mineral potential.

- investigates and publicizes the geology and mineral occurrences of the Province through its own exploration programs and through analysis of private sector exploration activities
- maintains a library
- monitors exploration work.

Engineering Division: responsible for ensuring that Nova Scotia mines are developed according to current safety, environmental, and mining practice and regulations.

- conducts engineering studies
- approves mining plans
- provides a contract diamond drilling service to private industry and government
- conducts mine inspections and maintains mine rescue stations
- trains personnel in mine rescue and first aid.

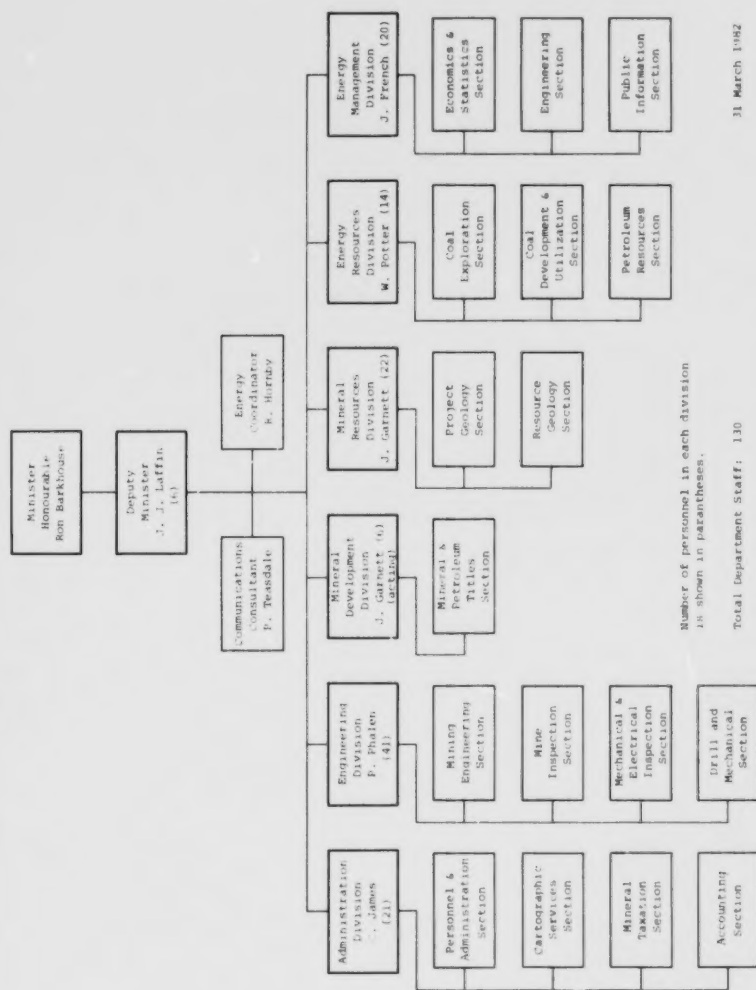
Mineral Development Division: responsible for issues involving the exploration and utilization of the Province's mineral resources.

- assists development of mineral resources
- maintains a mineral and petroleum titles registry.

Energy Resources Division: responsible for issues involving the development of the Province's indigenous energy resources, particularly coal, petroleum, and natural gas.

- monitors and regulates all petroleum exploration and development
- undertakes coal and peat exploration programs
- provides energy resource development.

Energy Management Division: responsible for issues involving the supply of energy from outside the Province and the demand for and utilization of energy within the Province.



31 March 1982

FIGURE 1. Organization chart of the Department of Mines and Energy.

- develops economic analyses and statistics on energy matters
- provides engineering services related to energy use
- develops and administers energy conservation programs
- provides public information about energy.

Administration Division: responsible for providing financial and other support services to the Divisions of the Department.

- provides financial auditing, accounting, and personnel services
- provides cartographic and photographic services.

The organization of the Department and each division is shown in Figure 1.

The Department has 130 employees. Most are based in Halifax and Stellarton. Other offices are maintained in Glace Bay and Springhill. The locations, phone numbers, addresses, and functions of each of the offices is shown at the end of the Annual Report.

MINERAL RESOURCES DIVISION

J.A. Garnett, P.Eng., Ph.D., Director

The Division is responsible for the initiation and implementation of geological studies and the monitoring of all exploration programs in the Province. The Division is divided into two sections, Project Geology and Resource Geology, to accomplish these respective tasks.

In 1981, field activities of the Project Geology Section were suspended due to delays in the completion of a new Federal/Provincial Agreement designed in part to provide cooperative funding for geological research programs. However, this did afford the opportunity for project geologists to complete publications emanating from the six year joint agreement between this Department and the federal Department of Regional Economic Expansion which concluded in March 1980.

In December 1981, a new two-year \$3.94 million Mineral Development Agreement was officially ratified by this Department and the federal Department of Energy, Mines, and Resources. The cost is shared 70 per cent by the federal government and 30 per cent by the provincial government. Programs to be implemented through this agreement include geological, geophysical and geochemical surveys; industrial, energy and metallic commodity studies; mineral inventory compilation; and development of exploration drill core storage and sample laboratory facilities. Private sector exploration, and consequently, monitoring, compilation, and evaluation activities of the Resource Geology Section, were at an all time high in 1981.

Project Geology Section

J.D. Keppie, Ph.D., Section Manager

Introduction

The Project Geology Section is responsible for collecting and publishing detailed information on the geology and mineral resources of the Province. It accomplishes this by conducting geological, geochemical, and geophysical mapping programs in different areas of Nova Scotia. The nine geologists in the Section interpret the data and make the results known to the public through publications of the Department and presentations at scientific meetings. Information about the geology and mineral resources of Nova Scotia is widely used by exploration companies, land use planning groups, environmental groups, federal and provincial departments, universities, and other scientists. Locations of the 1981/82 fiscal year projects are shown in Figure 2.

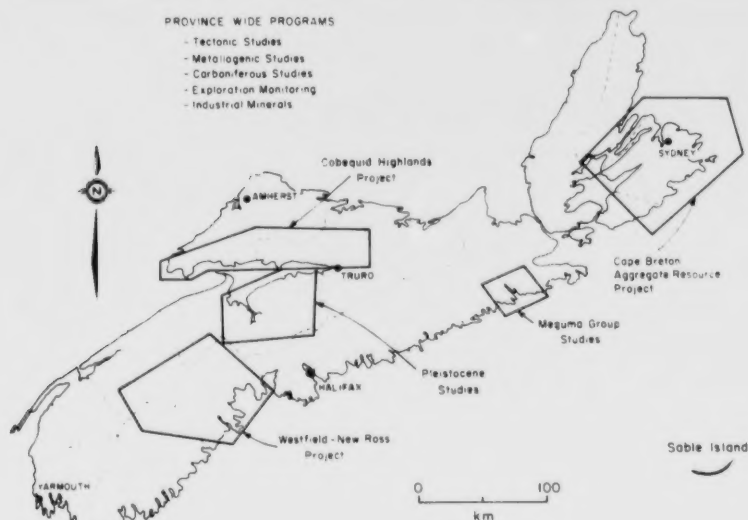


FIGURE 2. Locations of Mineral Resources Division projects.

Major Projects

During the 1981-82 fiscal year geologists of the section were involved in many major projects. Advice and assistance were given by the Geological Survey of Canada in planning and preparing for some of these projects. Some of the projects were originally funded under a DREE Canada-Nova Scotia Minerals Subsidiary Agreement that expired in March 1980.

Tectonic Studies. For several years geological information has been collected and evaluated by J.D. Keppie and other section geologists to produce a tectonic map. The map and report show the origin and development of geological entities that now comprise Nova Scotia through geological time. The tectonic map is useful in understanding the complex geological history of Nova Scotia. Exploration companies and other geologists will use it as a fundamental source of knowledge about the geological history of the Province.

Metallogenic Studies. Mineral occurrences and deposits are the central aspect of this project. Its purpose is to provide a basis for understanding Nova Scotia's mineral resource of metallic and some non-metallic minerals. The

project is headed by A.K. Chatterjee. It will result in the publication of a metallogenic map and report. They will show the categories of mineral occurrences and deposits in relation to major crustal features and geological rock units. This will be an important tool for exploration companies because the map will promote interpretations of where minerals may be found.

Typical of the detailed geological work supporting the development of the Metallogenic Map is the Westfield-New Ross Project headed by G.A. O'Reilly. This is a continuation of the geological investigation of the adjacent Lunenburg region begun in 1979. The results of this project are a better understanding of tin, tungsten, beryllium, copper, and lead mineralization in this area. Such detailed regional work greatly assists and stimulates exploration for minerals.

Carboniferous Studies. This major project originated during the DREE subsidiary agreement with the Department, 1974-1980. The project is headed by P.S. Giles and is focused on the Windsor Group of Carboniferous age. This Group of rocks is the source for the Province's production of salt, gypsum, and much of the limestone, anhydrite, and potash. The purpose of the project is to study this Group of rocks and to define the mineral resources and potential. The project is at an advanced stage where the ancient environment can be defined. In this way occurrences of salt, gypsum, potash, and anhydrite are better understood and possible new occurrences may be determined.

The success of this overall study of the Windsor Group depends on detailed studies of certain areas of exposure. R.C. Bochner has completed the detailed geological mapping of the Antigonish Basin. This study has clearly defined rock units and structure which allows a better understanding of the ancient environment and the resulting mineral occurrences.

Meguma Group Studies. The gold bearing strata (Meguma Group), underlying most of the "south shore" and "eastern shore" of southern Nova Scotia, is the focus of much exploration activity. The purpose of this project, headed by P.K. Smith, is to understand the controls of gold mineralization. The region around Sherbrooke, Guysborough County, is the location of detailed geological investigations.

Pleistocene Studies. Much of Nova Scotia's water resources and all of its sand and gravel resources are derived from glacial deposits. The purpose of this project, now complete, was the mapping and sampling of the glacial deposits in central Nova Scotia (Windsor region). This project was headed by R.R. Stea. A final report is being prepared; a map is now published.

Cobequid Highlands Project. This project focused attention on the geology and mineral resources of the Cobequid Highlands. It originated during the DREE subsidiary agreement and is headed by H.V. Donohoe, Jr. The project is nearing an end with coloured maps and a detailed report now being produced.

Other Projects. The Project Geology section compiled much information about the occurrences of uranium in rocks of Nova Scotia for the "Uranium Inquiry - Nova Scotia." This compilation and the preparation of an extensive computer file of chemical analyses were completed by K. White-Smith.

Publications

Publications by geologists of the section are the principal means of communicating their findings about the geology and mineral resources of the Province. These are mostly scientific reports published in Department publications or in scientific journals. Additionally, the geologists give lectures and talks at scientific meetings, local universities, and community or school groups.

Relevant, short technical reports for each of the projects appear in the annual Mineral Resources Division Report of Activities. A list of publications by the staff in this Division and other divisions appears in Appendix A.

Resource Geology Section

D.A. Murray, M.Sc., Section Manager

Introduction

The Resource Geology Section provides an information system for the collection, evaluation, and dissemination of geological data. It is also responsible for providing a liaison between the mineral industry and other departments of government regarding land use, exploration monitoring, and exploration regulation. The activities of the Resource Geology Section are coordinated through the Halifax and Stellarton Offices and are carried out under the following headings:

Halifax Office

- Mineral Inventory
- Industrial Minerals
- Land Use
- Library Services

Stellarton Office

- Exploration Monitoring
- Core Storage
- Surveying

Details of these programs are outlined in the following summaries. The location of some of the projects and activities of the Section are shown in Figure 2.

Mineral Inventory

The mineral inventory program involves the collection, input, retrieval, and dissemination of mineral resources information. The program is headed by N. Lyttle. Its purpose is to provide a database of mineral resources information to the Department, other government departments, exploration companies, and the public.

Early in 1981 a major effort was undertaken to input backlogged document data into GEOSCAN, the national database for geological information. The purpose behind this updating effort was to allow the production of four new computer-generated indexes, namely: an updated and revised Index to Assessment Reports; Keyword Index to Assessment Reports; Index to Publications, Open File Reports and Theses; and an Index to Drillhole and Well Data. A brief description of each index follows.

Index to Assessment Reports 1864-1980 (Report 81-4). This report is a bibliographic index, covering the period 1864 up to the end of 1980, of data contained in the non-confidential exploration assessment reports of the Nova Scotia Department of Mines and Energy.

Keyword Index to Assessment Reports 1864-1980 (Report 81-5). A keyword index to all the assessment reports listed in Report 81-4 has been produced. This keyword index is an alphabetic listing of all keywords used to describe the subject contents of all the assessment reports in Report 81-4, cross referenced against the assessment report titles in which they occur.

Index to Publications, Open File Reports and Theses 1862-1980 (Report 81-6). This report is a bibliographic index, covering the period 1862 up to the end of 1980, of information contained in the publications and open file reports of the Department and university theses on geoscience of Nova Scotia.

Index to Drillhole and Well Data 1862-1980 (Report 81-7). This report is a bibliographic index, covering the period 1862 up to the end of 1980, of information concerning drillhole and well data found in the non-confidential exploration assessment reports, publications, and open file reports of the Department.

Microfilming of Assessment and Open File Reports for 1981. During 1981, an additional 133 assessment reports and 30 open file reports became open. All of these reports have been microfilmed and can be purchased on microfiche or hard copy (produced from microfilm). Lists of these respective reports are published in the Mineral Resources Division Report of Activities for 1981 (Report 82-1).

Industrial Minerals

The production of industrial minerals, such as barite, gypsum, salt, limestone, dolomite, and silica sand, is important to the economy of Nova Scotia. Exploration and development activities continue for barite, potash, and silica sand. The industrial minerals geologist, J. Fowler, provides a liaison between the Department and exploration companies. He assists these companies and individuals who are interested in industrial minerals. A complete listing of industrial mineral and structural material production is given in Appendix B.

Aggregate Resources. The Cape Breton Island aggregate resources inventory mapping program was completed this year by W. Wright. Detailed information on all known sand and gravel deposits on the Island and rock suitability for crushing is being assembled for a published report to be released at a later date. Preliminary results of this survey are available on 1:50 000 aggregate deposit maps of the region.

Limestone. Several limestone and dolomite deposits in the Province were sampled and shipped to the Canmet Laboratories in Ottawa to determine their value for use in the fluidized-bed combustion of coal.

Industrial Mineral Commodities Map. Work began on the compilation of a new 1:500 000 industrial mineral commodities map for the Province.

Library Services

The Department maintains two libraries: a main library in the Halifax office, and a branch library in the Stellarton office. Over 3 000 maps, 2 500 exploration assessment reports, 500 open file reports, 200 different periodicals, journals and trade magazines, and numerous reference texts, theses, and other document types are held in the libraries. The libraries, under the direction of V. Brisco, function as important resource centres for information on the geology, energy resources, and mining history of Nova Scotia. To this end, the libraries provide the following services and facilities:

- reference and information service to the general public, provincial government personnel, professional geoscientists, engineers, and consultants in private industry
- sale of Department and Geological Survey of Canada publications and maps
- catalogued and classified files of the library holdings, including exploration assessment reports and open file reports
- a mailing list of individuals, institutions, and corporations that wish to be informed of our activities and publication releases
- facilities for photocopying, microfiche recording, and printing, and for making white print duplicates of maps.



FIGURE 3. Location of base metal exploration programs.

Exploration Monitoring

To keep abreast of geological data gathered by mineral exploration companies working in Nova Scotia, a program of exploration monitoring has been gradually put into place. The program is supervised by J. Bingley with the assistance of J. McMullen. This activity, when combined with the expansion of data available in the mineral inventory system and the planned core storage inventory, will greatly enhance the exploration geologist's appreciation of Nova Scotian geology.

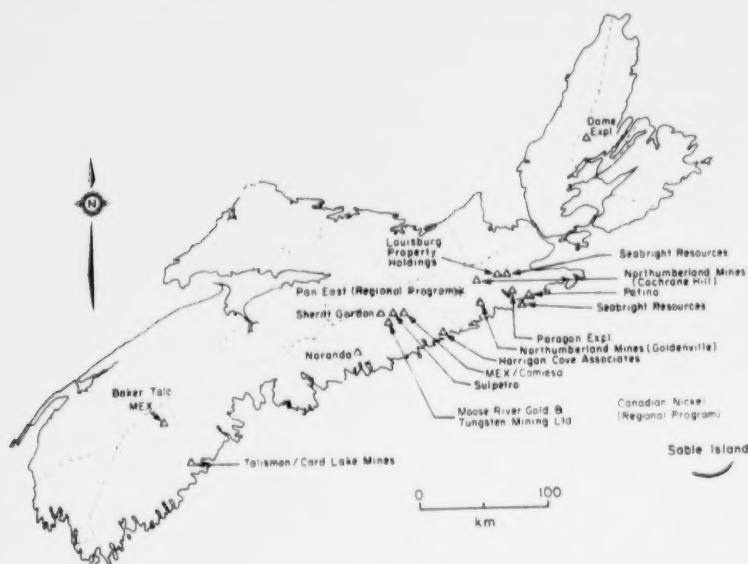


FIGURE 4. Location of gold exploration programs.

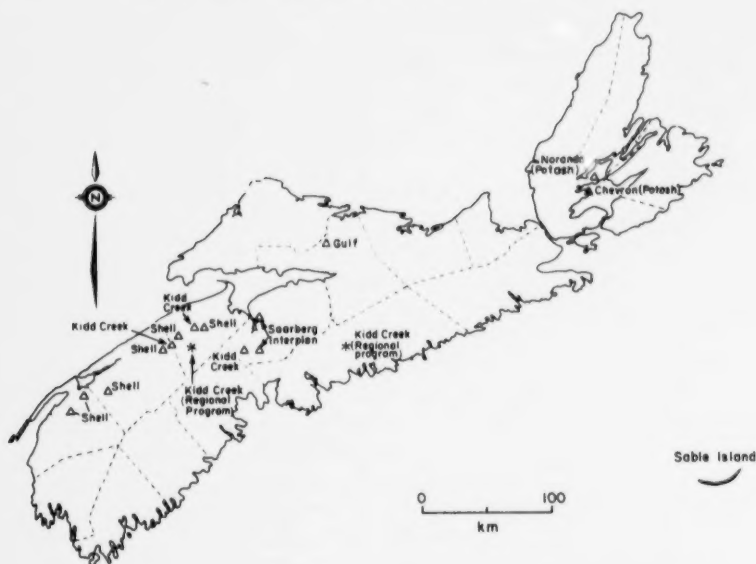


FIGURE 5. Location of uranium and potash exploration programs.

New reporting forms for exploration companies are now in use. They form the basis for a retrieval system of baseline information (where, what, and by whom work was done and how much it cost). The two geologists operating from the Stellarton office will be gathering more in-depth information, providing government-company liaison, checking to see that the terms and conditions for exploration licensing are followed, and other related duties.

During 1981, the considerable exploration activity produced a record exploration expenditure (see table on page 31). The locations of major exploration programs for base metals, uranium, potash, and gold are shown in Figures 3, 4, and 5.

Diamond-Drill Core Storage

Approximately 152 400 m of drill core are stored by the Department of Mines and Energy at various locations throughout the Province. Some 50 per cent of this core is in permanent core storage facilities in Stellarton and Debert with the remainder stored outside with variable amounts of temporary protection. Information is now being assembled for a report on drill core available in our core storage facilities.

Through a federal-provincial funding arrangement signed in December 1981, new buildings to house some 396 000 m of drill core will be constructed in Stellarton during 1982. Mechanized handling, laboratory facilities, and storage for a variety of geological specimen types will be incorporated into these structures.

In excess of 60 900 m of drill core provided by the exploration industry will be added to the core library once building space is available (late 1982). Additions to the core library in 1981 totalled some 16 263 m.

Surveying

All of the Department's diamond-drill holes are surveyed for location and elevation by J. MacDougal, surveyor. In addition, some work is done for private companies which have contracted the use of the Department's drills. Assistance is provided to exploration companies for locating holes drilled in previous years.

ENGINEERING DIVISION

P.W. Phelan, P.Eng., Director

Introduction

The Engineering Division is responsible for the administration and regulation of the mining industry in the province on behalf of the Department of Mines and Energy. These functions include the approval of new mining projects or modifications to existing projects, the responsibility for occupational health and safety of workers, protection of the environment, and efficient use of the Province's resources. The Division provides a diamond drilling service to the Mineral Resources and Energy Resources Divisions of the Department, to other government departments, and to the mining industry in the province on a cost recovery basis. The Division is responsible for maintaining the equipment and facilities needed for drilling activities and maintenance services for departmental vehicles.

Significant Events in 1981

A new mining venture was initiated by Novaco for an underground coal mine at Springhill. By the end of the year work was progressing well on a small open pit to establish a face for driving the slopes.

Shell Canada Resources Limited continued work on the East Kemptville tin deposit up to the time the company decided to withdraw from all base metal exploration and development in Canada, and the property was offered for sale. Metallurgical testing was completed and a feasibility report has been prepared.

Northumberland Mines Limited commenced operation of its test mill at Cochrane Hill, Guysborough County and produced the first gold for many years in the Province. There are several other gold properties on which bulk sampling and/or test milling are being conducted, some of which will, hopefully, evolve into operating mines.

Two mines ceased production during the year. Yava Mines Limited, a lead producer operating an underground mine 30 miles southwest of Sydney was placed in receivership and subsequently closed on September 17, 1981 due to low metal prices. Canada Wide Mines Limited, operators of an underground lead/zinc mine at Gays River, reverted to a development status due to severe groundwater problems that will require hydrogeological investigation and additional development work.

With regret we advise that two fatal accidents were reported. Mr. C.R. Marquis died as a result of an accident at a quarry operated by Construction Aggregate Limited at Aulds Cove. Mr. D.J. MacNeil died as a result of an accident at the Rocky Lake Quarry, Waverley, operated by Municipal Spraying and Contracting Limited. Both accidents were associated with the operation of conveyor belts.

Mining Examinations

Board of Examiners. Under the Coal Mines Regulation Act certain positions in underground operations must be filled by persons who have an appropriate "Certificate of Competency." A Board is responsible for overseeing the examinations and issuing the certificates.

The Board consists of five members appointed by the Minister of Mines and Energy:

A. MacKenzie, P.Eng., Glace Bay
H. Slauenwhite, P.Eng., Sydney
J. Reid, P.Eng., Sydney
J. Amirault, P.Eng., Halifax
P. Phelan, P.Eng., Halifax
(Secretary to the Board)

Certificates of Competency. Training and examinations for seven categories were held at the College of Cape Breton. The categories were: supervisor; mine examiner; mine electrician, first and second class; mine mechanic, first and second class; and hoist operator. Examinations were also held for the Certificates of Competency as mine manager and underground mine manager.

Each year the Mining Society of Nova Scotia awards a prize for the highest grade in examinations for mine manager, underground mine manager, and supervisor. This year (1981) the awards were made in two categories:

Manager - Michael A.K. Grice, P.Eng., Halifax
Manager Underground - Robert W. Pierryknowski, Sydney

The results of the examinations are shown in Tables 1 and 2.

TABLE 1. Examination results for certification under the Coal Mines Regulation Act.

Categories	Passed	Failed	Total
Manager	5	1	6
Underground Manager	12	1	13
Supervisor	14	0	14
Mine Examiner	21	3	24
First Class Mine Electrician	0	0	0
Second Class Mine Electrician	15	0	15
First Class Mine Mechanic	14	0	14
Second Class Mine Mechanic	36	0	36
Mine Surveyor	0	0	0
Hoist Operator	3	0	3
TOTAL	<u>120</u>	<u>5</u>	<u>125</u>
Percentage	96%	4%	100%

TABLE 2. Summary of other certificates issued by the Board of Examiners

First Class Miners	92
Mine Rescue	38
First Aid	23

Mining Engineering Section

The Mining Engineering Section provides technical advice to ensure that the Province's mineral and energy resources are utilized to their optimum and that mining operations are conducted within the regulations of the several mining acts in a safe, efficient, and environmentally acceptable manner. This includes reviewing proposals from industry for new mining projects or modifications to existing mines. Several other functions are performed by the Section:

- making recommendations for the issuing of mining leases and permits
- providing technical advice and assistance to industry and government on complex mining problems
- conducting economic and feasibility studies for mineral deposits on new projects

- providing technical assistance to mine inspection and mine rescue problems
- reviewing the mining legislation and providing recommendations for improvements to the Acts.

One of the Mining Engineers provides day-to-day management and technical services to Thorburn Mining Limited, a government operated coal reclamation facility in Stellarton.

Mine Inspection And Mechanical And Electrical Inspection Sections

P.W. Phelan, P.Eng., Chief Inspector

The Mine Inspection and Mechanical and Electrical Inspection Sections are responsible for the health and safety of employees in the mineral industry. Routine mine inspections are conducted under authority of the Coal Mines Regulation Act and the Metalliferous Mines and Quarries Regulation Act in all mines and quarries within the Province except those operated by the Cape Breton Development Corporation (where only the mine rescue stations are inspected by the Department). The Mine Inspection Section has a staff of eleven working from regional offices in Stellarton, Glace Bay, and Springhill.

TABLE 3. Inspection statistics for 1981.

Total Inspections	285
Mine Rescue Classes Conducted	6
Rescue Station Inspections	33
Mining Examinations Invigilated	23
Fatalities	2
Unusual Occurrences	13
Illegal Mines Closed	2

Mine Rescue

The Mine Rescue program is designed to promote the application of sound mine rescue principles.

- protect those actively engaged in the work of recovery in time of emergency
- rescue people that may be trapped
- rehabilitate the mine facilities.

Monthly training sessions are conducted at all underground mines in the Province. In addition, monthly inspections were carried out at the Cape Breton Development Corporation (CBDC) mine rescue stations.

Mine rescue instructors conducted classes in mine rescue procedure at the College of Cape Breton and at the Technical University of Nova Scotia to supplement the students' training.

The annual Provincial Mine Rescue Competition was held at the Miners Forum, Glace Bay, on Saturday, June 6, 1981. Five mine rescue teams from CBDC, one from Canadian Rock Salt at Pugwash, and one from Canada Wide Mines competed. The team from No. 26 Colliery (CBDC) won the competition.

At the end of the year there were 113 certified mine rescue persons, 17 trainees, 9 fresh air base men, 9 station attendants, 3 supervisors, and 2 inspector/instructors.

First Aid

First aid instruction is given at all mine sites. Inspections are made of the first aid facilities and programs at these mines. Thirty-two candidates were successfully certified in the St. John Ambulance emergency first aid course administered by the Department.

Drill and Mechanical Section

D. Polley, Section Manager

The Drill and Mechanical Section is responsible for operating Department diamond drills and maintaining all mechanical equipment and vehicles. The amount of drilling by Department drills declined by 11.7 per cent in 1981 compared with 1980 but the number of holes drilled increased by 13.4 per cent. The Coal Inventory Program continued to be the major utilizer of the Section's drilling equipment. Table 4 shows the usage of government drills since 1977. The diamond drills are available on a cost recoverable basis for use by other government departments and private industry.

TABLE 4. Annual drilling Statistics for the past five years.

Year	No. of Holes	Metres
1977	232	11 949
1978	118	7 380
1979	23	9 099
1980	142	8 506
1981	161	7 511

MINERAL DEVELOPMENT DIVISION

J.A. Garnett, P.Eng., Ph.D., Acting Director

During 1981, the Director of Mineral Resources also acted as Director of Mineral Development. The added responsibilities were in the areas of mineral resource regulations, mineral titles, and evaluations and recommendations regarding development opportunities, especially related to uranium, gold, tin, potash, and barite. Private sector successes in uranium exploration led to optimism about future uranium deposit potential. At the same time citizen's concerns about uranium exploration required considerable staff attention throughout the year. These concerns ultimately led to the declaration of a moratorium by Cabinet on the issuing and renewing of Special Uranium Exploration Licences in September. The Cabinet created an independent inquiry into all aspects related to this issue.

Mineral and Petroleum Rights Registry

R. Slater, P.Eng.,

Registrar of Mineral and Petroleum Rights

The Mineral and Petroleum Rights Registry is responsible for accepting applications for mineral and petroleum rights (both within the Province and offshore) and subject to verification for accuracy and availability of lands, for issuing and registering the licences or leases. In addition, any documents affecting licenses, such as transfers of title, assignments of interest, option agreements, special licences, and exploration agreements are registered by this office. The Registry also receives all statements of exploration expenditures and reports of activities that pertain to the consideration for renewal of licences or leases. In addition matters directly affecting licensing, maps showing the disposition of lands under licence or lease are maintained and continually up-dated. Applications for underground storage rights and treasure trove licences are processed through this office.

A large number of enquiries from industry, the public, and other government departments are answered each year. Procedures for obtaining rights, past exploration and mining activities, statistical information on production from operating properties, and general questions concerning licences issued, acreages held, etc. are the major subjects of enquiries. A notable service to the public and industry is the printing and supplying of the land disposition map sheets (1:31 680 scale) which are obtainable at cost. The Registry is responsible for all fees, bonds, and other monies due

TABLE 5. Mineral exploration trends in Nova Scotia.

	1976	1977	1978	1979	1980	1981
SUMMARY (onshore)						
Exploration Expenditure ¹	\$1 600 000	\$3 800 000	\$5 900 000	\$4 700 000	\$7 564 000	\$8 441 20.30
Total Licences Issued	1 489	2 894	2 393	1 841	2 559	1 952
CLAIMS RECORDED ONSHORE (hectares in parentheses)						
Base Metal	34 434 (572 613)	70 936 (1 146 326)	38 597 (623 728)	40 497 (654 432)	88 703 (1 433 441)	68 863 (1 112 826)
Uranium	21 526 (347 860)	48 721 (787 331)	31 978 (516 764)	30 920 (499 667)	25 483 (411 805)	6 225 (100 596)
Salt, Potash	224 (3 620)	887 (14 333)	1 148 (18 552)	2 256 (36 457)	13 505 (218 241)	5 225 (84 436)
Number of Mineral Assessment Reports	70	90	132	126	140	150
Total Areas in Hectares Held Under Licence	924 093	1 947 990	1 159 044	536 778	2 063 487	1 297 858
PETROLEUM LICENCES ISSUED (hectares in parentheses)						
Land Areas	29 (1 084 087)	20 (984 032)	37 (1 397 209)	44 (1 398 950)	52 (1 734 044)	99 (2 521 214)
Submarine Areas	179 (15 083 980)	160 (13 611 608)	160 (13 611 608)	147 (12 634 732)	151 (12 783 663)	172 (14 077 497)

¹Estimate from Department of Mines and Energy Sources

for licences, leases, statutory work deposits, payments in lieu of work, and sale of maps and other items such as acts and regulations.

During 1981 a record amount of money was spent for exploration in the Province. This amount, as shown in Table 5, has increased since 1976. The number of claims for base metal, salt and potash, and uranium have varied over the last five years.

ENERGY RESOURCES DIVISION

W.G. Potter, B.Sc., Director

The Energy Resources Division is accountable for the effective evaluation, promotion, control, development, and use of Nova Scotia's energy resources. The division has centred its activities in three general areas of responsibility: petroleum resources, coal development, and peatlands inventory.

Nova Scotia currently imports approximately 75 per cent of its primary energy from insecure foreign sources. It has established a clear objective to reduce this dependence and economic drain by displacing imported oil through the development and use of our indigenous energy resources. Coal production and use within Nova Scotia were minimal over the last 15 years and it is only in the last few years that a resurgence of use has occurred. Significant exploration for, and possible production of, oil and gas are new to the Province as is the use of peat and other renewable energy resources. The challenge to develop Nova Scotia's indigenous resources must be met through the development and effective implementation of credible programs to characterize these resources; realistic analyses and projects to demonstrate technologies for their production and use; and practical legislation and regulations to control their production and use for the benefit of the Province and the industries involved. The Division is involved in all of these steps.

Coal Exploration and Coal Development and Utilization Sections

C.E. Bain, Section Manager

Introduction

The Coal Exploration Section of the Energy Resources Division is responsible for the assessment of the quality and quantity of coal deposits in Nova Scotia. It supervises the orderly development of coal within the Province with regard to supply and demand and final utilization. The Coal Development and Utilization Section encourages and coordinates the development and efficient use of indigenous energy resources, especially coal.

Coal Exploration

Coal exploration in 1981 was concentrated in the Sydney, Pictou, and Cumberland coalfields. In the Sydney coalfield (Fig. 6), detailed exploration for near surface coal was carried out on a 3200 m block of the Gardiner seam lying east of the Sydney airport. The results of this program indicate an in situ resource of approximately one million tonnes of thermal coal at 10:1 strip ratio. Analyses of the coal shows average ash values at 11.6 per cent, sulfur of 3.3 per cent, and as-received calorific values of 30.6 MJ/kg.

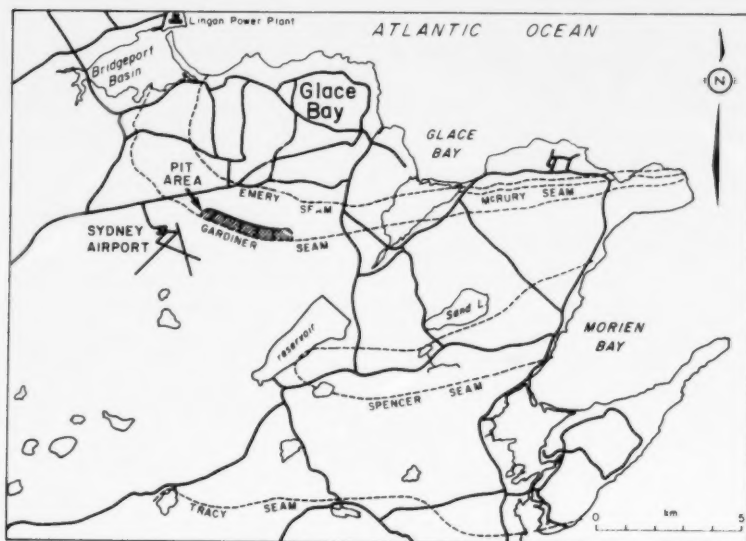


FIGURE 6. Exploration work in the Sydney coalfield. Area of interest is shaded along the Gardiner Seam.

An exploration program at Thorburn in Pictou County (Fig. 7) outlined a basin-like structure containing 1.5 million tonnes of in situ coal in the Upper and Lower McKay seams. The average ash content is 20 per cent and a sulphur content is 2 per cent. Calorific value was measured at 27 MJ/kg.

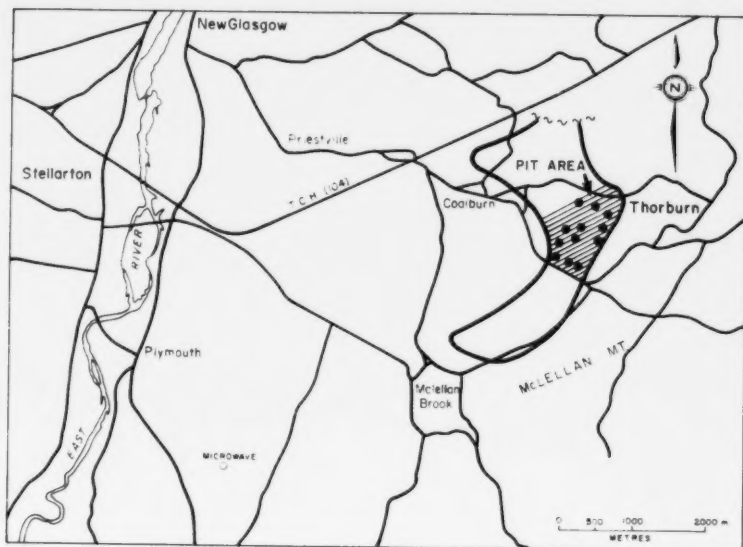


FIGURE 7. Exploration work in the Pictou coalfield. Area of interest is shaded.

Exploration activities in the Cumberland Basin (Fig. 8) were carried out in the Springhill coalfield and the Oxford coal basin. The Department drilled 28 diamond-drill holes and eight triconed holes on the Rodney seam prospect south of Springhill. Trenching was started on near surface sites. Norwest Resources Consultants of Calgary, under contract to Novaco, identified a mineable reserve of approximately three million tonnes in this area with good possibilities of expanding the reserve with further drilling downdip. A small open-pit operation is currently under development on this site which is expected to yield 100 000 tonnes/year of coal prior to mining operations going underground.

In the Oxford coal basin, follow-up mapping was conducted by the Coal Exploration Section after the previous year's program. BP Canada's coal division completed an eleven hole exploration program, but unfortunately the coal resources identified were deemed insufficient for BP to continue its investigation.

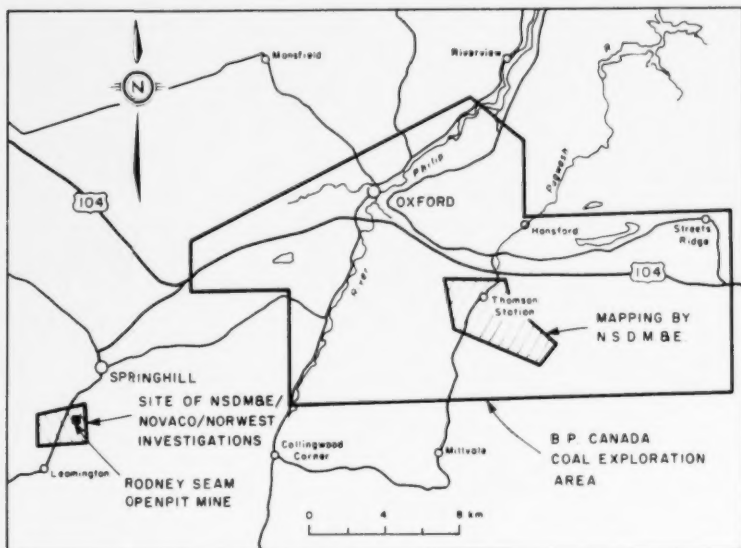


FIGURE 8. Locations of exploration work in the Springhill-Oxford region. Areas of interest are shaded.

Peatlands Inventory

The Coal Exploration Section is also responsible for the Peatlands Inventory Program which is involved with the assessment of fuel peat potential in the Province. The area that received the most attention was a concentration of bogs lying south of Lake Rossignol, Queens County where 2300 hectares of peatland were sampled (Fig. 9). Additional bogs were sampled in Shelburne and Halifax counties bringing the total area surveyed in 1981 to some 3400 hectares. Results of the investigations have shown that approximately 60 per cent of the 16 million tonnes surveyed can be considered as a suitable fuel peat.

Coal Development and Utilization

During the year, the Coal Development and Utilization Section accomplished the following:

- continued its involvement in the development of coal-oil-water mixtures

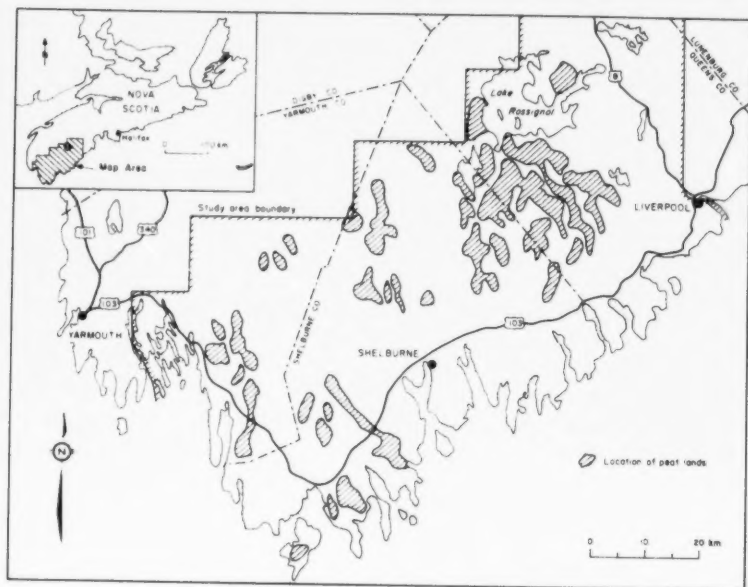


FIGURE 9. Locations of peat lands in southern Nova Scotia.

- initiated a coal beneficiation program, and a study concerning the environmental impact of burning coal
- lent support in establishing the Committee on Atlantic Coal
- evaluated several proposals for coal demethanization and studied the Pictou coalfields for this purpose
- helped support the coal liquifaction program at the Nova Scotia Research Foundation
- monitored new coal utilization technologies
- kept abreast of the coal supply and demand situation in the Province.

Several programs with which the Coal Section is involved come under federal/provincial agreements. One program, the Coal Beneficiation Study, has received partial funding from the National Research Council.

A partial list of coal related research and development projects of immediate interest to the Department of Mines and Energy is shown in Table 6.

TABLE 6. Coal research and development in Nova Scotia.

Major projects currently underway:

- 1) Demethanization program by Noval Technologies.
- 2) Coal-oil-water program at Scotia Liquicoal
- 3) Coal liquefaction program at the Nova Scotia Research Foundation (NSRF).
- 4) Coal combustion programs at the Centre of Energy Studies, Technical University of Nova Scotia.
- 5) Chemical desulphurization program at NSRF.
- 6) Fluidized bed program at Nova Scotia Power Corporation
- 7) Coal-water program between Cape Breton Development Corporation and Carbogel.
- 8) Coal beneficiation study at Nova Scotia Department of Mines and Energy.
- 9) Coal beneficiation programs at Technical University of Nova Scotia.
- 10) Pyrolysis program at Nova Scotia Research Foundation.
- 11) SABA coal beneficiation program at National Research Council.

Important areas requiring further and/or new research and development work:

- 1) Transportation and handling of coal in the Province.
- 2) The entire area of mine planning including safety, production, ground control, extraction ratios, training.
- 3) Coal beneficiation with the goal of reducing sulphur dioxide content in stack emissions to an acceptable level.
- 4) Combustion and handling of coal-liquid mixtures.
- 5) Carbonization and related coke making problems.
- 6) Coal blending and storage.
- 7) Coal conversions including liquefaction, pyrolysis, and gasification.
- 8) Underground in situ gasification.
- 9) In situ resource evaluation including better geophysical logging techniques, coal data banks, and reserve estimation.
- 10) Coal combustion including fluidized bed, slagging problems, ash composition, waste disposal, and costs.
- 11) Basic coal research to better determine physical and chemical properties of Nova Scotia coals.

Petroleum Resources Section

Introduction

The responsibilities of the Petroleum Resources Section are monitoring, evaluating, and regulating petroleum exploration and development activities onshore and offshore.

The 1981-82 fiscal year proved to be a busy, exciting year for the Petroleum Resources Section. A great deal of activity hinged around the petroleum potential of the Scotian Shelf, with preliminary seismic programs and more intensive drilling programs.

Numerous companies are operating singly and in joint venture onshore and offshore Nova Scotia. The Department evaluated and approved drilling and seismic programs done by Chevron onshore and Mobil Oil, Shell Oil, and Petro-Canada located on the Scotian Shelf and Sable Island areas. These areas are shown on Figure 10. On commencement of drilling, progress on the wells was monitored by the geological engineering staff through inspections made on a regular basis. The main areas of oil and gas exploration in the offshore area during 1981 are shown in Figure 10.

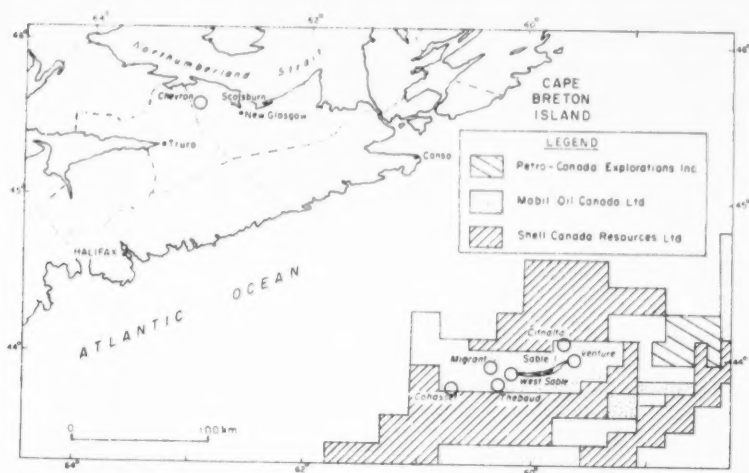


FIGURE 10. Locations of oil and gas exploration programs.

Federal Provincial Agreement

A new Petroleum Resources Act and Regulations was prepared in 1980 for the drilling industry. The situation for control by Nova Scotia changed however, when the Agreement between Canada and Nova Scotia on Offshore Oil and Gas Management and Revenue Sharing was signed on March 2, 1982. It established the organizational arrangement through which Nova Scotia can influence all aspects of oil and gas development activity in the offshore regions. This Division was instrumental in expediting the Canada-Nova Scotia agreement.

Petroleum Directorate

The Nova Scotia Petroleum Directorate is the agency designated to coordinate participation by the Nova Scotia government in the implementation of the agreement. The Petroleum Directorate will be based in the Department of Mines and Energy (Petroleum Resource Section) and will advise the Nova Scotia members of the Canada-Nova Scotia Offshore Oil and Gas Board on key issues such as exploration agreements, provisional leases, and production licences. The Directorate will be the lead agency within the Provincial Government in dealings with Canada Oil and Gas Lands Administration (COGLA) and the oil industry. It will handle operational activities (e.g., drilling and safety procedures) and will play a liaison and coordinating role in issues involving other departments of the provincial government (e.g. economic benefits and the fishery). In addition, the Petroleum Resources Section has assisted in the administration of environmental, industrial health and safety, and offshore training and survival instruction. The Section acts as a petroleum information centre for the public.

Other Activities

During the past year, staff of the Section at the request of industry and a variety of offshore trade associations reviewed contingency plans and feasibility studies for emergencies. This Section also has active representation in the Petroleum Technology Training Advisory Board Committee, Industrial Benefits conferences, and the Sable Island Environmental Protection Committee.

Geological studies of Mobil's Venture discoveries and Petro-Canada's Banquereau well and offsetting wells allowed a better understanding and control of stratigraphy and structure of the areas. Working cross-sections

and lithologic strip logs were drafted, maintained, and updated. Preparation of base maps has begun showing structural horizons on Nova Scotia's slope and shelf acreages.

Publications

A microfiche file was established covering well histories and wireline logs of all wells drilled on the Scotian Shelf. It corresponds with the existing GEOS-CAN system in the Library. The file will greatly aid and assist geological staff, the public, and companies interested in gaining information on the offshore wells.

An updated version of *Oil & Gas Exploration - Nova Scotia* was prepared. It is an informative publication outlining the Scotian Shelf petroleum situation, describing companies involved, their various programs, future possibilities, and also the basics of petroleum geology and engineering.

ENERGY MANAGEMENT DIVISION

J. French, Director

The Energy Management Division's major responsibilities lie in the planning for, and analysis of, changes in Nova Scotia's energy supply and demand situation. It is involved with the delivery of programs that increase energy efficiency and energy conservation by all sectors of the provincial economy, and the transmission, distribution, and pricing of energy resources in the Province.

The Division is divided into three sections: Economics and Statistics - providing energy analysis and evaluation; Energy Engineering - delivering programs to business and the public sector; and Public Information - providing energy conservation programs to the residential sector.

These sections administer a broad range of energy management, planning, and conservation programs, including those under a five-year \$24.8 million federal/provincial agreement on energy conservation.

Major energy developments offshore on the Scotian Shelf, and on land, in the form of the Trans-Quebec Maritimes Pipeline and the LNG (liquid natural gas) Canso Project, as well as policy announcements such as the 1981 Alberta/Ottawa Energy Pricing and Taxation Agreement were thoroughly analyzed and evaluated during 1981 and the first quarter of 1982 by the Division. This is essential to provide the necessary framework for provincial response to actual and impending developments in the energy field.

Important work by the Division included compilation of Nova Scotia's submission to the National Energy Board (NEB) on the Trans-Quebec Maritimes Pipeline and the Arctic Pilot Project as well as production of the Scotian Shelf Gas Development Study and other offshore development related work.

Energy management programs recorded a substantial increase in activity during the 15 months ending on March 31, 1982. Almost 400 audits of industrial, commercial, and institutional energy use were carried out, identifying potential energy savings of \$6.8 million. More than \$2.8 million was invested jointly by companies and governments in energy conservation under the Industrial Retrofit Grant Program; \$1.4 million was committed by the Pilot Projects Program towards the development of new energy technologies and renewable energy sources; and a Cogeneration and Waste Heat Program was started under the Canada/Nova Scotia Subsidiary Agreement on Energy Conservation.

Safety certification of solid fuel (mainly wood) burning stoves to national standards began in Atlantic Canada in 1981 at the Technical University of Nova Scotia by the Energy Test and Information Centre (ENERTIC), jointly funded by the Department and the federal government. ENERTIC'S Energy Resource Information Centre at the Nova Scotia Research Foundation Corporation also began operation in 1981.

Work in the energy conservation field accelerated during the period to meet increased public requests for advice, information and publications on nearly all aspects of energy conservation.

New publications aimed at the homeowner and renter were developed during the period. A multi-media conservation campaign funded jointly by the federal and provincial governments was recognized internationally and nationally for the excellence of its promotional material.

Division staff participated in negotiations for a new ENER\$AVE agreement during the period with the signing of a \$5 million federal/provincial accord scheduled for the second quarter of 1982.

Monitoring of energy supply and use figures was a significant activity for Division staff.

Primary energy consumption declined by nearly six per cent during 1981. This is the largest such decline on record since statistics were first recorded in the 1960's. Primary energy consumption is the total energy input into the economy. It includes petroleum, coal, electricity, and natural gas.

Sales of refined petroleum products dropped nearly nine per cent, meaning substantially lower oil imports. Imports now stand at 28.7 million barrels per year, down from 33 million barrels in 1978. Sales of all products, with the exception of diesel fuel, declined.

Economics and Statistics Section

V. Harnish, Section Manager

Introduction

The Economics and Statistics Section evaluates and analyzes issues involving energy development and its use. The Section also administers a comprehensive energy planning program and is responsible for statistical reporting on energy supply and demand.

Reports prepared by the Section are distributed to other sections within Mines and Energy, and, depending on the nature of the material, circulation may be widened to include other ministries, the public, and numerous energy corporations.

Activities

During the last fifteen months, the Section has been actively involved in a wide variety of issues dealing with offshore energy resources. Early in 1981 changes to the federal oil and gas regulations were analyzed. The Section began an indepth analysis of revenue sharing from potential oil and gas production in Nova Scotia under the federal and the proposed provincial regulations. By mid 1981, this study was completed and played a major role in federal/provincial offshore negotiations.

During the negotiations on the offshore agreement with the federal government, the Section collaborated with the Department of Finance in providing support to the Fiscal and Economic Subcommittee of the Offshore Negotiating Team.

The Section was able to provide estimates for the distribution of offshore revenue between the federal and provincial levels under a number of scenarios. The resulting data were also used by the Department of Finance to calculate various provincial revenue plans.

Staff of the Economics and Statistics Section during the year also initiated and completed a number of studies dealing with resource royalties. In late 1981, a study of the desirability and the economic feasibility of propane as a motor vehicle fuel was prepared.

The Section has been actively involved in the Arctic Pilot Project (APP) which concerns, among other important questions, the placement of the liquified natural gas regasification terminal in either Gros Cacouna, Quebec or Melford Point on the Strait of Canso. Staff has worked closely with others in developing the Province's intervention document to the National Energy Board (NEB) in favour of the Nova Scotia site, and has provided considerable analytical support to legal counsel and senior management.

The Section has an ongoing commitment to keep the Department updated on energy statistics and trends. A computer programmed energy fact sheet is produced on a monthly basis for distribution. This report contains data on the supply and demand for crude oil, petroleum products, coal, natural gas, electricity, and price trends.

The Economics and Statistics Section also has designed a computer program for coal statistics. This program gives a complete package of coal data by mine and by month and should accommodate the needs of all concerned Divisions within the Department.

It has been the responsibility of the Section to monitor developments concerning the proposed Maritime natural gas pipeline. As well as intervening on this project during NEB hearings, staff have prepared reports on issues such as the federal request for a route modification in Quebec and the Nova Scotia request to the applicant for a constant diameter line to Melford Point and the construction of the South Shore and Valley laterals. The Section prepared a slide presentation on natural gas availability in the Province.

During the year, energy planning activities have also included the co-ordination and/or involvement of Section staff in various studies contracted to outside consultants. These studies, which form a part of the Energy System Planning Program, included a study on Municipal Energy Management in Nova Scotia under the Canada-Nova Scotia Subsidiary Agreement on Energy Conservation; an assessment of the *Economic Impact of Scotian Shelf Gas*; and an evaluation of *Increased Use of Wood as an Energy Source*.

Staff has participated in the Provincial Advisory Committee to the Energy Supplies Allocation Board, which is the agency responsible for oil products allocation during a crude oil supply disruption. During the past year, the Section was an active member in the Interprovincial Advisory Council on Energy (IPACE) Subcommittee on Demand Restraint measures.

The Section provides immediate analysis to senior levels of government on subjects such as energy price and supply.

Economics and Statistics also administers the provincial government's Electric Rate Subsidy Program. As well, a Load Management Program, funded under the DREE/Nova Scotia Energy Conservation Agreement, is administered by the Section. Under this program the Nova Scotia Power Corporation is gathering load data and assessing the potential of direct load control or various forms of indirect load management such as marginal cost based time-differentiated pricing.

Engineering Section

C. Ryan, P.Eng., Section Manager

Introduction

The Engineering Section is responsible for the implementation of five major programs: EnerSave, Pilot Projects, Industrial Retrofitting Grant Program, Cogeneration and Waste Heat Utilization Program, and the Energy Test and Information Centre (ENERTIC) Program. The Section also carries out technical studies and monitors technological developments related to renewable energy and energy conservation. All programs and activities are directly aimed at reducing the provincial consumption of energy, particularly petroleum products.

TABLE 7. Expenditures for the EnerSave Program (January 1, 1981 to March 31, 1982).

	Industrial	Commercial	Institutional	Total
Audits	60	114	216	390
Energy Use:				
Electricity	\$9 002 900	\$2 353 100	\$3 940 000	\$15 296 000
Oil	7 254 400	1 819 700	4 590 600	13 664 700
Other	7 412 800	309 700	596 100	8 318 600
TOTAL	<u>\$23 670 100</u>	<u>\$4 482 500</u>	<u>\$9 126 700</u>	<u>\$37 279 300</u>
Average/Site	\$394 500	\$39 320	\$42 450	\$95 590
Potential Savings:				
Value	\$3 894 200	\$957 400	\$1 976 000	\$6 827 600
Percentage	16.4%	21.4%	21.2%	18.3%

Major Programs

EnerSave Program. The EnerSave Program provides energy audits, financial assistance to hire energy consultants, and energy conservation seminars to major sectors of the provincial economy. The program is managed by V. Powell. Although the federal-provincial agreement under which the EnerSave Program is operated expired on September 30, 1980, the program has

continued to operate in anticipation of a new agreement being signed. From January 1, 1981 to March 31, 1982, 390 energy audits were completed by the two Ener\$ave teams, each with an energy audit vehicle. The establishments that were audited had annual energy expenditures exceeding \$37.2 million. Potential savings of \$6.8 million annually were identified, an average of about 18.3 per cent. This is shown in Table 7.

Because of the expiry of the Ener\$ave Agreement, new applications for consulting assistance were not processed after July 1981. However, all outstanding commitments were honoured. During the fifteen month period, 76 consulting grants were paid valued at more than \$470 000. In spite of the suspension of approvals on applications, 87 requests for assistance were received.

Negotiations were actively pursued with Energy, Mines and Resources Canada during 1981 to develop a new Ener\$ave Agreement. A new \$5 million agreement was reached in early 1982 funded 80 per cent by the federal government and 20 per cent by the Province. Signing is expected to take place in the second quarter of the 1982/83 fiscal year, permitting the Ener\$ave Program to return to full operation.

Industrial Retrofitting Grant Program. The Industrial Retrofitting Grant Program, funded through the DREE/Nova Scotia Energy Conservation Subsidiary Agreement, provided financial assistance to industries, institutions, and some types of commercial establishments to implement energy conservation or fuel substitution projects identified through the Enersave Program. Direct grants reduce the payback on most projects to three years, a level that most businesses find attractive. The program is managed by J. Sandall.

During the period, 102 applications for grants were received and 86 were approved. A total of \$1 495 130 was committed to projects and payments totalling \$1 455 422 were made. Companies receiving grants contributed a further \$1.41 million to these projects, resulting in over \$2.86 million in energy conservation investments being made as a direct result of this program.

Projects funded included building insulation, heat recovery equipment, computer controlled load schedulers, destratification equipment, and wholesale changes to energy supply systems and plant design. Equally varied were the types of establishments which participated in the program. Among these were senior citizen homes, poultry farms, breweries, bakeries, greenhouses, fish plants, churches, office buildings, and warehouses.

Pilot Projects Program. The Pilot Projects Program, also funded on a cost shared basis through the DREE/Nova Scotia Energy Conservation Subsidiary Agreement, is primarily designed to encourage the development and demonstration of new energy conservation technologies and to stimulate the conversion to renewable energy sources. The program provides financial and technical assistance for demonstration projects involving energy conservation and the use of solar, wind, hydro, and biomass energy sources. Financial participation from the proposers is normally expected, the amount varying according to the degree of risk involved. V. Munroe manages the program.

During the period from January 1, 1981 to March 31, 1982, 25 new projects were approved resulting in program commitments of \$1 024 000. Actual cash flow over the fifteen months amounted to \$976 940. Program activity is summarized in Tables 8 and 9.

Several projects deserve special mention. During 1981, \$260 000 in program funds were committed to a \$390 000 project at National Sea Products Ltd.'s Lunenburg plant. There, a Kelley pyrolytic incinerator is generating process steam from the combustion of waste paper. Eventually other forms of waste will also be incinerated using this equipment.

Two projects were initiated during the period to demonstrate energy conservation measures which are appropriate to specific types of buildings. Assistance totalling \$100 000 is being provided to eight schools across the Province to demonstrate energy retrofits which are practical and financially attractive. A further \$100 000 has been allocated to demonstrate what can be done to improve the energy efficiency of recreation facilities in the Province. Five rinks and three swimming pools are involved in this project.

A substantially different type of project is being undertaken with the Halifax, Dartmouth, and Halifax County Metropolitan Authority. The program is providing \$64 000 of a \$94 000 project to extract methane gas from the regional landfill site and to use this gas for heating buildings.

Using funds from the Pilot Projects Program, the Small Scale Energy Demonstration Program was offered for the second time during 1981. The program provides individuals and groups with the opportunity to submit proposals for assistance with the cost of demonstrating small scale renewable energy or energy conservation technologies. Eighty-nine projects were selected by a panel of independent judges from 263 proposals submitted. Assistance totalled \$389 000 on projects with a value of \$729 000. A summary of approved projects is provided in Table 10.

TABLE 8. Origin of proposals - Pilot Projects Program (period of January 1, 1981 to March 31, 1982)

Project Origin	No. of Projects Approved	Value of Projects	Program Commitments
Solicited Proposals	4	\$ 348 056	\$ 254 722
Unsolicited Proposals	21	1 311 249	769 411
TOTAL	<u>25</u>	<u>\$1 659 305</u>	<u>\$1 024 133</u>

21 proposals approved out of 81; received \$204 827 provincial funds and \$819 306 in federal funds through DREE

TABLE 9. Project types for the Pilot Projects Program.

Project Type	Number of Projects	Program Commitments	Percent of Total
Energy Conservation			
buildings	5	\$309 581	30.2%
transportation	3	64 705	6.3
process	2	20 647	2.0
SUBTOTAL	<u>10</u>	<u>\$394 933</u>	<u>38.5</u>
Biomass	7	466 150	45.5
Active Solar	2	45 750	4.5
Hydro	1	12 000	1.2
Wind	1	15 000	1.4
Waste Oil Utilization	1	4 660	0.5
Heat Pumps	3	85 640	8.4
TOTAL	<u>25</u>	<u>\$1 024 133</u>	<u>100.0%</u>

TABLE 10. Approved projects - Small Scale Energy Demonstration Project

Type of Technology	No. of Projects	Assistance	Per cent
Attached sunspaces	29	\$ 93 360	24%
Solar & greenhouses	4	15 560	4
Solar domestic hot water	10	35 010	9
Solar space heating	9	23 340	6
Solar pool heating	4	19 450	5
Wind energy conversion	13	81 690	21
Heat pumps	11	58 350	15
Innovative residential construction	4	27 230	7
Biomass combustion	3	15 560	4
Coal gasification	1	7 780	2
Hydro	1	11 670	3
TOTAL	89	\$389 000	100%

Cogeneration and Waste Heat Utilization Program. This program is also cost shared by the Province and DREE under the Energy Conservation Subsidiary Agreement. Its objectives are to identify the opportunities for using cogeneration and/or waste heat recovery in Nova Scotia and to promote the use of these technologies through seminars, demonstrations and grants for site specific evaluations. It is managed by P. Burchell.

A major consulting study to examine the potential for cogeneration and waste heat utilization was carried out by Shawinigan Engineering Maritimes Ltd. and completed in 1981. The study identified potential energy savings of over \$60 million per year in Nova Scotia industry through financially attractive waste heat recovery projects. Two demonstration sites were also identified and section staff completed planning for a waste heat recovery seminar presented at three locations in Nova Scotia during April 1982.

ENERTIC. The Energy Test and Information Centre (ENERTIC), funded through the Nova Scotia/DREE Energy Conservation Subsidiary Agreement, also falls within the jurisdiction of the Engineering Section. The Centre consists of two distinct operations, a solid fuel testing facility at the Technical University of Nova Scotia and an energy information resource centre at the Nova Scotia Research Foundation Corporation. Services are provided by these two organizations through contracts with the Nova Scotia Department of Mines and Energy.

During 1981 a full-time general manager was retained through a contract with the Nova Scotia Research Foundation Corporation. The general manager is responsible for coordinating and overseeing the activities of the two operations, promoting ENERTIC'S services, and identifying new opportunities for ENERTIC.

The solid fuel test centre reached an agreement during 1981 enabling it to carry out safety certification of stoves for local manufacturers with the Underwriters Laboratory of Canada (ULC). Heating efficiency and thermal output testing were conducted on a number of appliances. The effect of catalytic converters on wood stoves was tested. Testing was also carried out on the efficiency and thermal output of various configurations of fireplace inserts.

The testing laboratory considerably improved the standard test procedures used in the continuous instantaneous heat loss method of heating appliance testing. Information from this work has been of benefit in the industry wide effort to develop a North American standard test procedure for wood fired heating appliances. In addition, the test centre has broadened its capability by adding equipment that enables it to conduct detailed combustion emission testing and exhaust gas analysis, and by installing a 1465 kW flame tunnel to be used for testing burner and fuel systems.

The information centre provides energy-related information for use by both the public and private sectors, and encourages the development of technical innovations by carrying out preliminary evaluations of ideas and inventions. Between January 1, 1981 and March 31, 1982, seven inventors' ideas were assessed and 175 inquiries were processed.

Other Activities

The Engineering Section was also involved in several other activities. Staff are responsible for approving applications for provincial sales tax rebates on solar and wind equipment. Applications involving one wind system and eighteen solar systems were processed and site inspections carried out. A number of energy conservation products for which sales tax exemptions were requested were evaluated and recommendations forwarded to the Provincial Tax Commission. The Section carried out studies on waste oil collection and use within the Province, optimum levels of insulation for residential structures, design of a monitoring system for the wood waste-fired steam plant at Gordon's Greenhouses Ltd., and safety and effectiveness of vaporizing pot type waste oil burners. Residential energy audit techniques were analyzed and a preliminary computer program developed for residential energy analy-

sis. The Section also participated on the steering committees for the provincial spending and taxation policy study, municipal energy management study, wood availability study, and an overview study of energy conservation and fuel substitution opportunities in the transportation sector.

Public Information Section

J. Gordon, Section Manager

Introduction

The Public Information Section is responsible for helping people reduce energy use in their residences by providing factual and motivational information and programs on energy conservation.

Information and programs are delivered directly by the Section and by outside organizations with the financial and administrative support of the Section. Section activities are funded either directly by the Department or in cooperation with the federal Department of Regional Economic Expansion under the public information component of the Canada/Nova Scotia Agreement on Energy Conservation.

In addition to its mandate to effect energy conservation at the residential level, the Section produces and/or arranges for press releases, publications, and promotion of programs and activities of other sections within the Energy Management Division.

Operations

Direct public services include staffing of a provincial toll-free line for public inquiries on specific energy conservation issues. Independent advice is provided to callers. Usage increased significantly during the 15-month period to March 31, 1982, with a greater degree of detail requested by callers. Staff also answered a larger number of similar questions received in writing.

The Section maintains an energy conservation display which was set up and staffed at major exhibitions and special events in the Province. In addition, section staff make presentations on request. In the reporting period, these included a seminar on government conservation programs at the residential level (Universite Ste. Anne), insulation problems (municipal building inspectors training course), microwave cooking demonstration (Town of Port Hawkesbury), seminar on furnace efficiency (City of Halifax), and

energy auditors training sessions (City of Sydney). Seminars on fuel economy were held in Sydney, Bridgewater, Amherst, and Bedford using an automotive consultant as featured speaker.

In concert with DREE, the Section mounted a multi-media advertising campaign based on the theme "Put Your Energy Into Saving Some." This campaign used print, television, back-of-bus, billboard, and posters media to bring important information on energy conservation measures and devices to Nova Scotians. Regarded as one of the best government advertising campaigns in recent years, its back-of-bus advertisement won an international advertising award in New York and its billboard won a national advertising award in Toronto. Major elements of the campaign dealt with home heating, furnace servicing, fuel economy, public transportation, hot water, and lighting.

Distribution of publications is also an important function of the Section's energy conservation mandate. In addition to previously published material on conservation and renewable energy sources distributed by or on behalf of the section, new material was published during the period to March 31, 1982. This included *Consumer's Guide to Energy*, distributed to all provincial households by mail, *The Facts About Hot Water*, distributed in Nova Scotia Power Corporation bills, *The Facts About Car Mileage*, distributed by the Registry of Motor Vehicles, and *One Hundred and One Solar Energy Projects*, distributed by the Nova Scotia Government Bookstore.

Audio-visual material produced during the period included a 13-minute colour film, *Energy and the Auto*. Thirty copies are in circulation. A course on wood heating was purchased for use by the Provincial Firefighters School in training volunteer firemen.

Annual programs carried out by the section are Energy Awards and Conservation Days. Energy Awards are made to companies, government agencies, community groups, and individuals for outstanding contributions to energy management. Winners in 1981 were Volvo Canada, Gordon's Greenhouses, Jasper's Restaurant, Public Works Canada, Transport 2000 Atlantic, and Mr. Robert Fraser.

Conservation Days, developed by the Department and now known as International Energy Days, was held in Antigonish in 1981 simultaneously with programs in four other provinces and six New England states.

The Section also plays a leading role in energy education in public schools. Energy Education Program provided classroom presentations by

section staff to more than 3000 students per month during the reporting period. A substantial number of student requests for energy information are handled by section staff.

Staff represented the Department on numerous provincial, regional and national committees and task forces, including Council of Maritime Premiers Energy Education Committee and the Canadian General Standards Board Insulation Contractors Certification Program.

Staff also prepared background documents on energy conservation issues. These included reports on furnace conversion to natural gas and urea formaldehyde foam insulation.

ADMINISTRATION DIVISION

C. R. James, RIA, Director

The Administration Division provides administrative support services to the operational activities of the Department.

The Division is responsible for the collection of royalties and mineral taxes and for management and evaluation of government funded coal mine/miner assistance programs.

During the year the Administration Division assumed the responsibility for performing accounting services for Nova Scotia Resources Limited in addition to the accounting services it provides for Novaco Limited.

The duties and functions of the Division are divided within the following sections: Accounting, Mineral Taxation, Personnel & Administration, and Cartography.

During the past year, the Division has upgraded its information systems in keeping with its responsibility of information management. A new departmental computer system for accounting records and reports was fully implemented; the Management Plan and Budget system was strengthened; and personnel management was reorganized. The mineral taxation section was introduced to administer royalties.

Accounting Services Section

K. Faulkner, RIA, Section Manager

The Accounting Services Section performs financial and statistical accounting, and provides financial control over Department expenditures, revenues, and recoveries. Information is forwarded to other Provincial and/or Federal departments as necessary. Financial reports are made available to departmental managers for evaluation of their programs. A new computer system has been implemented which more clearly ties actual expenditures to the Management Plan and Budget.

The Section also provides accounting services for Novaco Limited and Nova Scotia Resources Limited, both Provincial Crown Corporations.

Financial Programs for Coal

The Section administers three financial programs; the Independent Coal Mines Subsidy Program, the Coal Miners Pre-retirement Leave Program, and the Dosco 1923 Pension Program.

The Independent Coal Mines Subsidy Program has been in operation since 1968. The program provides financial assistance to independent coal mine operations providing a measure of economic stability to communities heavily dependant upon the continuance of the industry. Subsidies in excess of \$800 000 were granted during the past fiscal year to the two remaining participants in the program; Evans Coal Mines Limited of Inverness and Drummond Coal Company Limited of Westville.

The Coal Miners Pre-retirement Leave Program is designed to alleviate the hardships of employees who are forced to leave the mine work force due to a cutback in production or closure.

The Dosco 1923 Pension Program is payable to eligible former employees of Acadia Coal Company Limited who retired by December 31, 1976.

During this fiscal year approximately 75 participants received pensions. Another 105 received benefits under the pre-retirement leave program. Benefits in excess of \$500,000 were granted for these programs.

A revised computer system was implemented to improve the database for these programs.

Mineral Taxation Section

B. McMullin, Mineral Tax Auditor

The Mineral Taxation Section is responsible for maximizing revenues from mineral royalties and taxes. The Section has developed and implemented reporting systems and auditing procedures designed to encourage compliance with mining statutes and regulations. Royalties received during the fiscal year 1981-82 are shown in Table 11.

The Section also proposes amendments to statutes and regulations to meet changing conditions and maintain equity.

During the fiscal year all mineral producers tax returns were analyzed. Ten field audits were completed.

TABLE 11. Royalties, taxes (including audit assessments) for the fiscal year ending March 31, 1982.

Gypsum	\$621 355.55
Coal	619 328.93
Salt	242 921.81
Lead/Zinc	61 380.00
Other ¹	34 320.18
TOTAL	<u>\$1 579 306.47</u>

¹Industrial limestone, silica, anhydrite, barite

Personnel and Administration Section

P. Edwards, Section Manager

This Section provides a staff service to all Divisions of the Department, assisting them on personnel issues. The responsibilities of this section include the provision of selection programs, establishment and maintenance of performance appraisals, career development training, personnel and payroll documentation, and the maintenance of employee files.

The Section is also responsible for the continual upgrading of office and administrative services for the Department.

Due to a major expansion of the Department during this period increased emphasis was placed on the personnel function to support departmental activities.

A new personnel records and filing system was established for control purposes. During the latter part of 1981 a new job evaluation system for management and non-bargaining positions was implemented by the Department. Development of a performance appraisal system for management staff of the Department was begun during this fiscal year.

Throughout the year increasing emphasis was placed on identifying training and development needs. As a result several staff members attended different courses which increased their productivity and effectiveness.

During the period January 1, 1981 to March 31, 1982 the Department experienced many personnel changes. These are shown in Table 12.

TABLE 12. Personnel changes during the period January 1, 1981 to March 31, 1982**Appointments**

Alexander Anderson	Krista Kennedy	Donald MacNeil
Edward Bain	Gerald Matheson	Curtis MacNeil
Wayne Burt	Lois Miller	Valery Penny
Heather Chandler	Christopher Moir	Jamshid Pirooz
Catherine Connors	Stephen Monk	Diane Reid
Paul Edwards	George MacLeod	Gerard vanHeuven
Ken Faulkner	William McCann	Douglas Whitman
Richard Hornby	Blair McMullin	Janet Wood
Rita Jones	John McMullin	Peter Woolaver

Separations

John Amiraault	Kathy Joedicke	Edmund Smith
Ian Annis	Richard Joseph	Karen White-Smith
Mel Coombs	Donald McCarthy	Brian Wilson
Peter Dumaesq	Sandra Parsons	Toby Wilson
Robert Fraser	Richard Shaffner	

Deceased

Frank Shea

Transfers

Joyce Hirtle

Retirements

Henry Buckles	Lawrence Chabassol
Carmen Carter	Aubrey MacDonald

Cartographic Services Section

D.H. Bernasconi, Section Manager

The Cartographic Services Section provides drafting and photographic services for all Divisions of the Department. During the past year, this Section produced a wide variety of technical drawings and geological maps for publications and presentations.

As part of a continuing program, the drafting unit prepared or updated a number of mining claim maps (1:31 680 scale) for plotting areas held under the Mines Act and the Petroleum and Natural Gas Act. These maps are available as "white prints" made from film tracings.

The photography unit looked after field assignments as well as public relations photography associated with mining industry functions. It reproduced material for inclusion in departmental and national publications, exploration assessment plans for mining companies, photographs for displays, and slides for lecture purposes.

Photomechanical processes form an integral part of the work carried out by the section. The photographic unit supplied services and facilities for the general photographic needs of the Department. In addition it was able to assist other government departments and mining exploration companies throughout the year.

LEGISLATION

Introduction

The Nova Scotia Department of Mines and Energy receives its legislative mandate from the Public Service Act. This Act provides for a Department of Mines and Energy and appointment of a deputy minister. Further, it designates certain basic legislation and certain functions involved with energy and mineral issues for administration by the Department.

Seven Acts are administered by the Department or affect its operation.

Mineral Resources Act (replaces Mines Act)

The Mineral Resources Act governs the disposition of mineral rights for exploration and development, administrative procedures, resource management requirements, and royalties. Stone, sand, gravel, peat, soil, gypsum, limestone oil, natural gas, and oil shale are not considered "minerals" under this Act.

Coal, uranium, salt, and potash were withdrawn from application under Exploration License as of June 1, 1975. Special licenses may be granted for work involving these minerals by Governor-In-Council (Mk 1008).

Petroleum and Natural Gas Act

The Petroleum and Natural Gas Act governs disposition of mineral rights for petroleum and natural gas exploration both onshore and offshore.

Gas Storage Exploration Act

The Gas Storage Exploration Act governs the exploration and development of underground storage of liquid or gaseous petroleum products.

Treasure Trove Act

The Treasure Trove Act governs the exploration for precious stones and metals in a state other than their natural state. Terms and conditions of licence and royalty requirements are prescribed by the Governor-in-Council.

Coal Mines Regulation Act

The Coal Mines Regulation Act governs operation and safety in coal mines. Cape Breton Development Corporation mines are not covered by the Act because the Canada Department of Labour inspects federal crown corporations.

Metalliferous Mines and Quarries Regulation Act

The Metalliferous Mines and Quarries Regulation Act governs operation and safety in metalliferous mines (i.e. mines not covered by Coal Mines Regulations Act) and quarries (except quarries operated by the Department of Transportation).

Gypsum Mining Income Tax Act

The Gypsum Mining Income Tax Act establishes reporting procedures and rates of income tax on gypsum mining operations.

An Act to Confer Certain Powers Upon the Lieutenant Governor-in-Council and to Amend the Mines Act

Certain powers are conferred on Lieutenant Governor-in-Council for purposes of maintaining an acceptable level of stability in the Coal Mining Industry. This Act provides authority for a subvention program for independent coal mine operators (OIC 73-78), pre-retirement leave program (OIC 77-574), coal waste dumps reclamation project (OIC 73-574), and establishment of Novaco (OIC 78-265).

APPENDIX A

DEPARTMENTAL PUBLICATIONS

New publications of the Department are listed here in this Appendix. The list includes only those books, reports, papers, or maps which have been published. Departmental personnel prepare many unpublished open file reports and maps, submissions, and papers, etc. These are available through the departmental library.

Copies may be purchased or obtained from the Library, second floor, Joseph Howe Building, 1690 Hollis Street, Halifax. Some of the publications are available at the departmental library in Stellarton (Bridge Street) and the Nova Scotia Government Bookstore, 1597 Hollis Street, Halifax.

Mineral Resources Division

- PAPER 80-1: Geology of the Cape North Area, Northern Cape Breton Island, Nova Scotia, by A. S. Macdonald and P. K. Smith.
Price: Hard Copy \$5.00, Microfiche \$1.00
- PAPER 81-1: The Fisset Brook Formation at Lowland Cove, Inverness County, Nova Scotia by P. K. Smith and A. S. Macdonald.
Price: Hard Copy \$2.00, Microfiche \$1.00
- PAPER 81-2: Major Transgressive - Regressive Cycles in Middle to Late Viséan Rocks of Nova Scotia, by P. S. Giles.
Price: Hard Copy \$2.00, Microfiche \$1.00
- REPORT 81-2: Compilation of Igneous Chemical Analyses from Nova Scotia, up to 1978, compiled by J. D. Keppie, P. K. Smith, and M. A. K. Grice.
Price: Hard Copy \$4.00, Microfiche \$1.50
- REPORT 81-1: Mineral Resources Division, Report of Activities 1980.
Price: Hard Copy \$8.00, Microfiche \$2.00
- REPORT 81-3: Drilling logs of government core drills, 1980, compiled by Ian MacDougall and D. E. Polley.
Price: Hard Copy \$3.50, Microfiche: \$1.00

INFORMATION

SERIES #4: Fifth annual open house and review of activities, December 2 and 3, 1981, program and, summaries.
Price: Hard Copy \$1.00, Microfiche: \$1.00

REPRINT 81-1: Determination of gold in natural waters at the parts-per-trillion (pg cm^{-3}) level, by R. B. Brooks, A. K. Chatterjee, and D. E. Ryan, 1981, 7 p. Reprinted from Chemical Geology, 33, 1981.
Price: Hard Copy: \$1.50, Microfiche: \$1.00

MAP 81-4: Pleistocene Geology and Till Geochemistry Central Nova Scotia (1:100 000 scale), by R. R. Stea and J. H. Fowler.
Price: \$3.50

Energy Resources Division

Oil and Gas Exploration in Nova Scotia 1981-1982. Price \$2.00

Energy Management Division

A Case Study Wood Energy for Small Industry, Oxford, Nova Scotia.
Price: \$10.00

Energy . . . A Plan for Nova Scotia. A Proposal from the Energy Planning Organization 1979. Price: \$5.00

LNG Canso Project Questions and Answers. Free

Consumer's Guide to Energy, Something Worth Saving. Free

One Hundred and One Solar Energy Projects. Price: \$3.50

Save Energy and Give Yourself a Raise. Free

The Auto Pak. Free

The Sun Book (ISBN 0-88871-003-8).
Price: \$3.50 for out-of-province requests

The Wood Book (ISBN 0-88871-002).
Price: \$1.50 for out-of-province requests

Wind Power (ISBN 0-88871-008-9).
Price: \$2.50 for out-of-province requests

APPENDIX B**PRODUCTION INFORMATION FROM MINES,
QUARRIES, AND OTHER OPERATIONS**

In this appendix each producer is described and located. Tables B-1 to B-5 summarize the production figures for each commodity or mineral. Locations of operations are shown on the accompanying Figures B-1 to B-4. The number under the column "Men Employed" in Tables B-1 to B-5 represents production personnel only.

Base Metal and Gold Mines

Three companies operated during the 1981-82 fiscal year. Their locations are shown in Figure B-1 and their production is summarized in Table B-1.

Base Metal Mines**CANADA WIDE MINES LTD.**

Manager:	D. M. McKee
Address:	P. O. Box 59, Milford Station, N.S., B0N 1Y0
Production:	367 741 tonnes ore 4 063 tonnes lead concentrate 7 433 tonnes zinc concentrate
Employees:	191 (when production ceased) 20 (since that time)

The Gays River Mine is located in a lead zinc deposit in the Gays River area of Colchester and Halifax Counties. It is a wholly-owned subsidiary of Esso Minerals Canada Ltd. Production was suspended on August 15, 1981 due to severe ground water problems and low grade ore which is mined by the room and pillar method. Engineering and development work is continuing to overcome these problems.

YAVA MINES LTD.

Manager:	L. O'Gorman
Address:	R.R. #1, East Bay, Cape Breton, N.S., B0A 1H0
Production:	180 316 tonnes ore 12 306 tonnes lead concentrate
Employees:	88 (when production ceased)

TABLE B-1. Base metal mines.

COMPANY	LOCATION	MILLED (tonnes)	CONCENTRATE PRODUCED (tonnes)	MEN EMPLOYED AT YEAR END	MAN SHIFTS	APPROXIMATE VALUE
Lead						
Yava Mines Ltd. ¹	Salmon River	180 316	12 308	—	14 560	\$ 8 123 280
Canada Wide Mines Ltd. ²	Gays River	242 736	4 270	20 ²	40 784	2 618 580
TOTAL (lead)			16 578			10 741 860
Zinc						
Canada Wide Mines Ltd.	Gays River	See above	7 757	20 ²		5 054 440
TOTAL (lead and zinc)			24 335			15 796 300

¹Mine closed September 17, 1981²Production stopped - mine development only

The mine was placed in receivership and production ceased on September 17, 1981. No other company showed any interest in purchasing the property so the assets have been disposed of by the receiver.

Gold Mines

NORTHUMBERLAND MINES LTD.

President: W. Young
Address: P. O. Box 120, Sherbrooke, N.S.,
B0J 1C0

The company commenced operation of a cyanide mill at Cochrane Hill Mine site in the Fall of 1981. The first gold production was declared in 1982. The company is mining ore from a small pit and conducting milling tests to determine gold recovering from highly irregular ore zones.

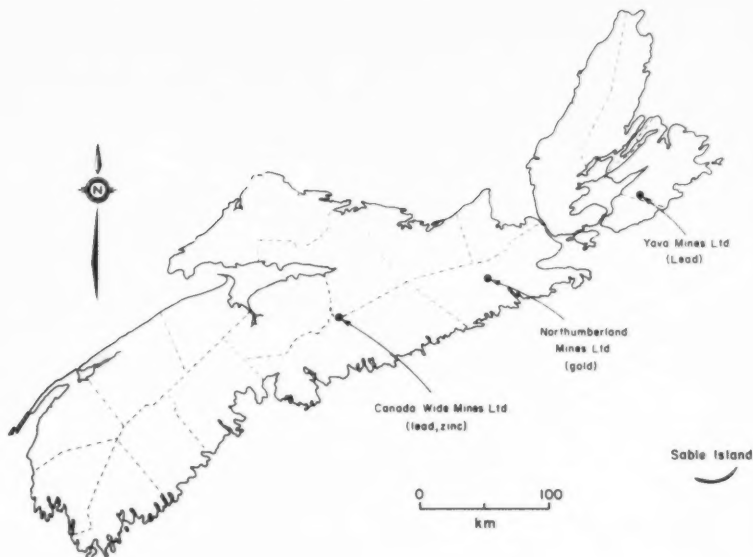


FIGURE B-1. Location of base metals and gold mining activity.

Coal Mining Operations

In 1981, there were five producing underground coal mines, two open pit coal mines, and two coal dump reclamation plants. Under active development were one underground coal mine, one open pit, and one coal dump reclamation plant. Table B-2 summarizes production information. The location of the operations is shown in Figure B-2.

Underground Coal Mines

DRUMMOND COAL COMPANY LTD.

Manager:	G. Dooley
Address:	P. O. Box 929, Westville, N.S., B0K 2A0
Production:	10 611 tonnes coal
Employees:	38

The Drummond No. 2 mine is located near the town of Westville, N.S. The entire output of the Drummond Mine is gained by the room and pillar method of mining. The coal is cut, shot, and hand loaded into mine cars at the coal face. The mine cars are then hauled to the main holding bottom and hoisted via the main slope to the surface.

EVANS COAL MINES LTD.

Manager:	G. Evans
Address:	R. R. #1, Inverness, N.S., B0E 1N0
Production:	35 699 tonnes coal
Employees:	52

The Saint Rose Colliery, Inverness Co., is owned and operated by Evans Coal Mines Ltd. The entire output is produced by room and pillar system of mining with the use of slushers. The coal is then transported to the haulage level by chain conveyor, loaded into one-ton mine cars, and hoisted to surface in the main slope.

CAPE BRETON DEVELOPMENT CORPORATION

The Cape Breton Development Corporation (CBDC), a federal crown corporation, operates four coal mines in Nova Scotia, two of which are under

development. The Cape Breton Development Corporation mines are inspected by Labour Canada and are not under the jurisdiction of the Department. Production data for these mines are recorded in this report.

Lingan Mine:	Lingan
No. 26 Colliery:	Glace Bay
Prince Mine (Development):	Point Aconi
Donkin/Morien (Development):	Donkin
Total Production:	2 178 830 tonnes coal
Total Employees:	2 364

Open Pit Coal Mines

NOVACO LTD.

Manager:	C. White
Address:	P. O. Box 147, Sydney Mines, N.S., B1V 1Y3
Production:	183 647 tonnes coal
Employees:	27 (including contractor)

The Point Aconi strip mine is owned by Novaco but the actual mining is carried out under contract by Nova Construction Co. of Antigonish. The overburden is drilled, blasted, and removed by a dragline excavator. The exposed coal seam is loaded into trucks with a small shovel. Prior to sale the coal is crushed in a bradford breaker which rejects rock fragments. The other coal mines under active consideration by Novaco are an open pit on the Gardiner Seam in Cape Breton and an underground mine on the No. 3 seam in Springhill.

T. BROGAN & SON CONSTRUCTION LTD.

Manager:	T. Brogan
Address:	P. O. Box 199, Florence, C.B., B0C 1J0
Production:	56 637 tonnes coal
Employees:	18

Two strip mines are operated at Point Aconi, Cape Breton. Site No. 1 is at Big Head and Site No. 2 is at Table Rock. The overburden is removed by scraper and bulldozer and the exposed coal is ripped with a bulldozer and

loaded into trucks with a front-end loader. Site reclamation was carried out on worked-out areas.

Coal Reclamation Plants

THORBURN MINING LTD.

Manager: C. Carr
Address: P. O. Box 1000, Stellarton, N.S.,
B0K 1S0
Production: 27 001 tonnes of reclaimed coal
Employees: 39

The coal mine dump reclamation project had its eighth year of operation in 1981 under the guidance of Thorburn Mining Limited, PICORD, Nova Scotia Department of Mines and Energy, and NOVACO. The supply of suitable dump material is nearly exhausted and the plant is expected to close in mid 1982.

SELMINCO Inc.

Manager: D. Frederickson
Address: P. O. Box 189, New Waterford, N.S.,
B1H 4N9
Production: 46 602 tonnes reclaimed coal
Employees: 25

This company operates one coal reclamation plant working the Princess Mine dumps, near North Sydney and is developing a further plant which will reclaim dumps in the Scotchtown area.

TABLE B-2. Coal mining operations.

COMPANY	LOCATION	PRODUCTION (tonnes)	MEN EMPLOYED AT YEAR END	APPROXIMATE VALUE
Cape Breton Development Company				
Prince Mine	Point Aconi)			
Lingan Mine	Lingan)	2 178 830	1 826	\$119 835 650
No. 26 Colliery	Glance Bay)			
Evans Coal Mine Ltd.	St. Rose, Inverness	35 699	52	1 963 445
Drummond Coal Company Ltd.	Westville	10 611	38	583 605
TOTAL (underground)		2 225 140	1 916	122 382 700
T. Brogan and Son			18	3 115 035
Construction Ltd.	Point Aconi	56 637	27	10 100 585
Novaco Ltd.	Point Aconi	183 647		
TOTAL (open-pit)		240 284	45	13 215 620
Thorburn Mining			39	1 485 055
Selminco Inc.	Stellarton	27 001	25	2 563 110
	Sydney Mines	46 602		
TOTAL (reclamation)		73 603	64	4 048 165
TOTAL ALL PRODUCERS		2 539 027	2 025	\$139 646 485

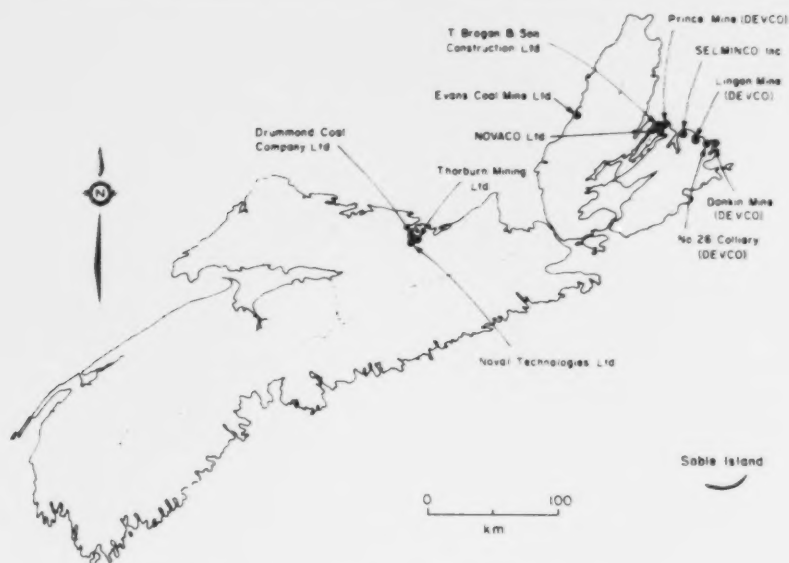


FIGURE B-2. Location of coal mining operations.

Industrial Minerals

Industrial minerals form a significant part of the total mineral production in Nova Scotia. Thirteen quarries or mines produce gypsum, salt, anhydrite, limestone, barite, and dolomite. The locations of these mines or quarries is shown on Figure B-3. Table B-3 summarizes production information.

Gypsum and Anhydrite

DOMTAR CONSTRUCTION MATERIALS LTD.

Manager: S. G. Johnson
 Address: P. O. Box 758, Windsor, N.S. B0N 2T0
 Production: 7 323 tonnes calcined gypsum
 Employees: 9

Domtar Construction Ltd operates a small gypsum quarry at MacKay Settlement. The actual quarry operation is done under contract by D. MacDonald. Domtar is the only gypsum operation in the Province that undertakes any processing of the crude gypsum. The gypsum produced is calcined.

FUNDY GYPSUM CO. LTD.

General Manager: G. Raymond
Address: P. O. Box Windsor, N.S., B0N 2T0
Production: 136 817 tonnes anhydrite
1 262 379 tonnes gypsum
Employees: 130

The Fundy Gypsum Company Ltd. quarries and plants are located in the Wentworth and Miller Creek areas near Windsor, Nova Scotia, while the shipping facilities are located at Hantsport, N.S. Selective quarry mining using truck and shovels is used to produce gypsum and anhydrite. The materials are crushed and transported via unit train to ship loading facilities at Hantsport for shipment to wall board manufacturing plants in the United States. Two quarries are in operation: Wentworth, which produces anhydrite and gypsum, and Miller Creek, which produces gypsum only.

GEORGIA-PACIFIC CORPORATION

General Manager: J. Graham
Address: P. O. Box 400, Port Hawkesbury, N.S.,
B0E 2V0
Production: 675 231 tonnes gypsum
Employees: 45

The quarry is situated at River Denys, Inverness Co. The gypsum is transported by rail to ship loading facilities at Port Hastings. At the quarry the overburden is stripped by a dragline excavator and the gypsum is recovered by shovel and truck.

LITTLE NARROWS GYPSUM COMPANY LTD.

Manager: D. W. McAdam
Address: Little Narrows, N. S., B0E 1T0
Production: 37 470 tonnes anhydrite
652 809 tonnes gypsum
Employees: 61

The company operates a gypsum and anhydrite quarry at Little Narrows with ship loading facilities on the Bras d'Or Lake. This is the oldest gypsum quarry operating in the Province; it started in 1936.

NATIONAL GYPSUM (CANADA) LTD.

General Manager: J. R. Cameron
Address: P. O. Box 637, Dartmouth, N.S., B2Y 3Y9
Production: 1 981 322 tonnes gypsum
Employees: 79

National Gypsum operates the largest gypsum quarry in the Province at East Milford and a ship loading facility at Wright's Cove, Dartmouth. Unit trains transport the gypsum between the quarry and the dockside from where it is shipped to east coast U.S. markets.

Salt**CANADIAN SALT CO. LTD.**

Manager: D. Hosking
Address: Box 160, Pugwash, N.S., B0K 1L0
Production: 918 373 tonnes salt
Employees: 160

The Pugwash Mine is located in the village of Pugwash, Nova Scotia. A room and pillar system of extraction is employed utilizing trackless diesel equipment. All production is gained from the 255 m level. In this system of extraction the working faces are first undercut and then blasted and loaded by front-end loaders onto trucks for transportation to a central underground crushing station. Once crushed, the salt is then skip-hoisted and fed to the processing plant on surface. This plant produces industrial grades, blocks for farm use, and refined salt for domestic consumption. The industrial grades are either supplied in bulk for truck transportation, bagged for rail transportation, or transported in bulk or bag to storage and shiploading facilities at the Pugwash Harbour wharf.

DOMTAR CHEMICALS GROUP -SIFTO SALT DIVISION

Manager: R. E. Simmie
Address: Box 550, Amherst, N. S., B4H 4A1
Production: 86 598 tonnes salt
Employees: 74

Domtar Chemicals Group, Sifto Salt Division, operates a solution salt mine located near Nappan, Cumberland County. The mining procedure involves the drilling of a hole to the underground salt deposit. Water is pumped down to the deposit where it dissolves the salt, forming brine. The brine is then forced back to the surface where the salt is extracted using the "vacuum pan" process.

Barite

NYSTONE CHEMICALS LTD.

Manager:	J. Boertjes
Address:	Box 64, Debert, N.S., B0M 1G0
Production:	Ore mined - 8706 tonnes Barite concentrate - 306 tonnes
Employees:	22

Nystone Chemicals has completed its first full year of operation mining the reactivated Brookfield barite deposit. The ore is mined using open pit methods by a contractor who transports it to the North River Sand and Gravel Co. for crushing and storage in the latter's quarry. The ore is then shipped to the Debert Air Industrial Park for treatment in the company-owned mill. The barite concentrate is leached and ground to a fine powder and is sold for pharmaceutical use.

Limestone and Dolomite

CANADA CEMENT LAFARGE LTD.

Manager:	D. King
Address:	P. O. Box 5, Brookfield, N.S., B0N 1C0
Production:	713 122 tonnes limestone
Employees:	12

Canada Cement LaFarge Ltd. operates a limestone quarry at Brookfield, Colchester County, where the total production from the quarry is processed by an on-site cement manufacturing plant, owned and operated by the company. The company also operates an industrial sand pit in Belmont; however, there was no production from the pit in 1981.

MOSHER LIMESTONE LTD.

Manager: R. Mosher
Address: P. O. Box 28, Upper Musquodoboit, N. S., B0N 2M0
Production: 134 000 tonnes limestone
Employees: 25

The Mosher Limestone Co. Ltd. operates two quarries on a rotating basis in the Upper Musquodoboit area of Halifax County and produces an agricultural grade dolomite/limestone. The product, when processed, is supplied in bulk or bagged for wide distribution throughout the Atlantic Provinces as fertilizer and soil conditioners.

RIDGE BROKERS LTD.

Manager: J. L. Murray
Address: P. O. Box 59, Havelock, N. B., E0A 1W0
Production: 36 362 tonnes limestone

The company operates a quarry at South Side, Antigonish Harbour. Production was resumed in 1981 after shipping from stockpiled material in 1980.

SCOTIA LIMESTONE LTD.

Manager: L. P. Kent
Address: P. O. Box 457, Sydney, N.S., B1P 6H4
Production: 47 625 tonnes limestone
Employees: 15

Scotia Limestone Ltd. operates two quarries: one at Irish Cove producing limestone and one at Frenchvale, a former dolomite producer, which is not producing crushed rock for the construction industry. In 1981, 10 533 tonnes of dolomite were shipped from stockpiled material. The main market for Scotia Limestone is the supplying of fluxes and refractory material to Sydney Steel Company.

TABLE B-3. Industrial minerals production.

COMPANY	LOCATION	PRODUCTION (tonnes)	CALCINED (tonnes)	SHIPMENTS	MEN EMPLOYED	MAN SHIFTS	APPROXIMATE VALUE
Gypsum							
Georgia-Pacific Corporation (Bestwall Div.)	River Denys	675 231	—	673 243	45	9 949	\$4 051 386
Dontar Construction Materials Ltd	McKay Settlement	7 323	7 323	5 456	9	2 268	43 044
Fundy Gypsum Company Ltd.	Miller Creek and Wentworth Creek	1 262 379	—	1 304 158	130	35 347	7 574 274
Little Narrows Gypsum Company Ltd.	Little Narrows	652 809	—	664 491	61	11 204	3 916 854
National Gypsum (Canada) Ltd.	East Milford	1 981 322	—	2 011 912	79	18 152	11 887 932
TOTAL (gypsum)		4 578 915	7 323	4 659 260	324	76 920	\$27 473 490
Anhydrite¹							
Fundy Gypsum Company Ltd.	Wentworth Creek	136 817	—	136 598			820 902
Little Narrows Gypsum Company Ltd.	Little Narrows	37 470		40 425			224 820
TOTAL (anhydrite)		174 287		177 023			\$1 045 722

TABLE B-3. Continued.

COMPANY	LOCATION	PRODUCTION (tonnes)	SHIPMENTS	MEN EMPLOYED	MAN SHIFTS	APPROXIMATE VALUE
Salt						
Canadian Salt Co. Ltd.	Pugwash	918 373	899 007	160	40 326	\$30 572 637
Domtar Chemical Group- Sifto Salt Division	Nappan	86 598	76 815	74	19 154	2 882 847
TOTAL (salt)		1 004 971	975 822	234	59 480	\$33 455 484
Barite						
Nystone Chemicals	Brookfield	8 706 ²	306 ¹	22	8 052	244 800
Limestone						
Ridge Brokers Ltd	South Side	36 362	5 908	—	—	163 629
Antigonish Harbour	Irish Cove	47 625	39 766	15	602	214 312
Scotia Limestone Ltd.	Marble Mountain	6 000	1 883	3	30	27 000
Nova Scotia Sand & Gravel	Upper Musquodoboit	134 000	124 000	25	6 532	603 000
Mosher Limestone	(non-cement usage)	223 987	171 557	43	7 164	\$1 007 941
SUBTOTAL		713 122	—	12	2 976	—
Canada Cement LaFarge Ltd.	Brookfield	937 109	171 557	55	10 140	1 007 941
TOTAL (limestone)						
Dolomite						
Scotia Limestone Ltd.	Frenchvale	nil	10 533	—	—	—
Dolomite worked out - quarry now producing crushed rock.						

¹Labour statistics are included in the corresponding Gypsum Operation²Ore mined³Barite concentrates

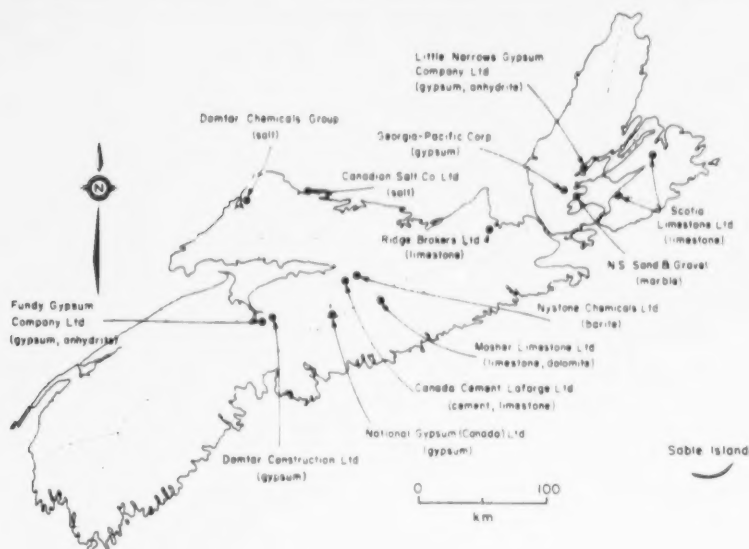


FIGURE B-3. Location of industrial minerals mining operations.

Structural Materials

Crushed stone, sand and gravel, and granite comprise the structural materials category. Production information is summarized in Table B-4. The location of granite production is shown on Figure B-4.

Crushed Stone

The Province has 12 operators who produced a total of 3 367 095 tonnes in 1981 and employed 159 men. Individual company figures are shown in Table B-4.

Sand and Gravel

There are 31 producers of sand and gravel operating in the Province. During 1981, production was 4 787 436 tonnes and 266 people were employed. It is estimated that an additional 3 011 289 tonnes of sand and gravel were produced by companies involved in highway construction. Detailed production figures are shown in Table B-4.

TABLE B-4. Structural minerals production.

COMPANY	LOCATION	PRODUCTION (tonnes)	SHIPMENTS	MEN EMPLOYED	MAN SHIFTS	APPROXIMATE VALUE
Crushed Stone						
Atlantic Sand & Gravel Ltd.	Kearney Lake	248 639	293 000	12	2 000	\$ 1 044 264
Conrad Brothers Ltd.	Montague	619 867	481 867	40	936	2 603 441
Construction Aggregates Ltd.	Mulgrave	449 855	449 855	18	2 700	1 889 391
Gateway Materials Ltd.	Kearney Lake Road	407 618	492 346	19	5 937	1 711 996
Levatite Construction Ltd.	Sydney	139 196	139 196	7	1 575	584 623
C. R. MacDonald	Antigonish	2 347	2 347	3	10	9 857
Municipal Spraying & Contracting	Rocky Lake	1 021 000	1 078 435	36	5 550	4 288 200
Satellite Construction Ltd.	(Bedford)					
New Glasgow		124 651	124 651	7	1 280	523 534
Scotia Limestone Ltd.	Frenchvale	9 877	9 877	—	—	41 483
Steed and Evans Ltd.	Dartmouth	100 000	100 000	8	1 200	420 000
S. W. Weeks Construction Ltd.	New Glasgow	69 841	69 841	4	—	293 332
W. Eric Whebbly Ltd.	Dartmouth	174 184	174 184	5	800	731 573
TOTAL (crushed stone)		3 367 075	3 415 164	159	21 988	\$14 141 715
Sand and Gravel						
Aberdeen Paving Ltd.		447 480		—	—	\$ 1 163 448
Acadia Road Contractors Ltd.		194 600		15	1 155	505 960
Canadian Pacific Railway (C.P.R.)		3 084		—	—	8 018
Carson Enterprises Ltd.		22 676		6	—	58 958
Chiasson Bros. Ltd.		8 163		5	—	21 224
Cumberland Paving & Contractors Ltd.		100 000		12	1 440	260 000
Doug Burns Excavating		50 000		3	450	130 000
Everett (1972) Ltd.		27 500		3	600	71 500

TABLE B-4. Continued

COMPANY	LOCATION	PRODUCTION (tonnes)	SHIPMENTS	MEN EMPLOYED	MAN SHIFTS	APPROXIMATE VALUE
L & M Gallant Contracting, Trucking Ltd.		57 143		6	—	148 572
R. Hiltz Excavating Ltd.		87 075		15	—	226 395
Ideal Concrete Ltd.		15 000		6	24	39 000
Inter Supply Ltd.		108 000		9	1 755	280 800
Kell Enterprises Ltd.		10 000		5	—	26 000
Latimer Construction Ltd.		16 327		—	—	42 450
Malcolm S. MacDonald Co. Ltd.		84 372		2	390	219 367
Martell's Construction Ltd.		397 038		10	1 560	1 032 299
Maurice Ready-Mix		24 002		1	—	62 405
Meadows Sand & Gravel Ltd.		75 000		5	800	195 000
Mosher and Rawding Ltd.		68 027		—	—	176 870
Municipal Ready Mix Ltd.		318 000		25	4 000	826 800
Nova Scotia Sand & Gravel		500 000		42	10 500	1 300 000
Permanent Concrete Ltd.		401 912		14	4 167	1 044 991
W. Strong		2 177		5	—	5 660
Vernon H. Shaw		61 500		2	330	159 900
Standard Paving Maritime Ltd.		457 523		20	3 033	1 189 560
G. M. Sweeney Construction Ltd.		10 000		3	624	26 000
W. K. Sharp & Son (Const.)		22 676		7	—	58 958
Tidewater Construction Ltd.		315 364		14	—	819 946
Warren Maritimes Ltd.		775 587		27	5 596	2 016 526
Will-Kare Paving & Contr. Ltd.		27 210		4	—	70 746
Yarmouth Sand & Gravel Ltd.		100 000		—	—	260 000
TOTAL REPORTED		4 787 436		266	36 424	\$12 447 353
Not Reported (mainly Department of Transportation)		3 011 289	7 829 351			
TOTAL (sand and gravel)		7 798 725				\$20 276 684

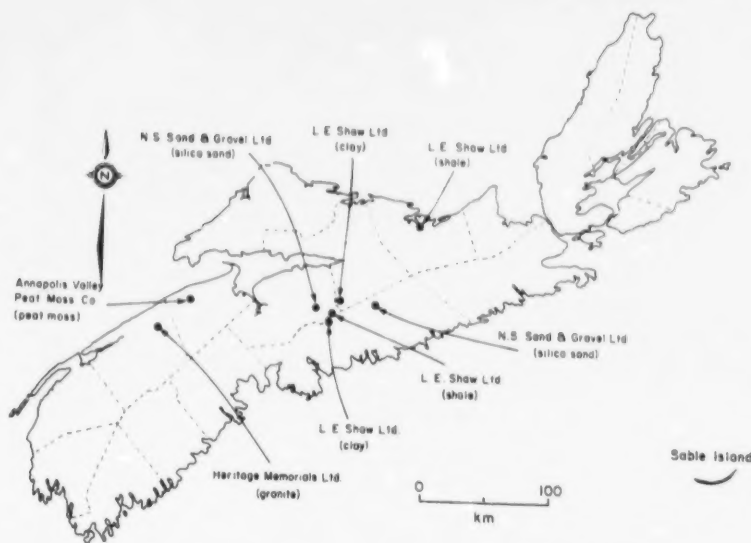


FIGURE B-4. Location of structural materials and miscellaneous materials operations.

Granite

HERITAGE MEMORIALS LIMITED

Owner: M. Nelson
 Address: P. O. Box 308, Windsor, N.S., B0N 2T0
 Production: 300 tonnes (approx.) dimension stone

The company operates a small quarry at Nictaux West to obtain grey granite as part of its requirements for memorial works at Windsor. The operation is seasonal and depends upon market requirements.

Miscellaneous Materials

The production of miscellaneous materials is shown in Table B-5. Locations are given on Figure B-4.

Clay, Shale, Industrial Sand, Marble**L. E. SHAW LTD.****(INCLUDING NOVA SCOTIA SAND AND GRAVEL)**

President:	A. Shaw
Addreses:	5251 Duke Street, Halifax, N.S., B3J 1P3
Production:	25 397 tonnes clay 24 489 tonnes industrial sand 132 269 tonnes industrial sand 139 tonnes limestone (marble)
Employees:	9

L. E. Shaw and its subsidiary company, Nova Scotia Sand and Gravel, operate seven properties in Nova Scotia. The clay and shale are quarried from pits at Lantz, Milford, and Shubenacadie (all in Hants County), and a quarry in New Glasgow, Pictou County. The materials quarried are used in the company plant located in Lantz, N. S., for the manufacture of bricks and tiles. The company also produces industrial sand at Elmsdale, Brazil Lake, and Sandy Desert and architectural limestone from the Marble Mountain quarry.

Peat Moss**ANNAPOLIS VALLEY PEAT MOSS CO.**

President:	H. Endres
Address:	Berwick, N.S., B0P 1E0
Production:	10 000 tonnes peat moss
Employees:	25 full-time 25 part-time

The peat bog is some 500 acres in area and during the five summer months up to 560 m³ per day are harvested depending upon the weather.

TABLE B-5. Miscellaneous materials production

COMPANY	LOCATION	PRODUCTION (tonnes)	SHIPMENTS	MEN EMPLOYED	MAN SHIFTS	APPROXIMATE VALUE
Clay and Shale						
L. E. Shaw Ltd. Clay	Lantz Shubenacadie	17 234 8 163 <u>25 397</u>		1 3 <u>4</u>	250 250 <u>500</u>	\$ 64 628 30 611 <u>95 233</u>
TOTAL (clay)						
L.E. Shaw Ltd. Shale	Milford New Glasgow	11 791 12 698 <u>24 489</u>		1 1 <u>2</u>	250 250 <u>500</u>	44 216 47 617 <u>\$ 91 833</u>
TOTAL (shale)						
TOTAL (clay and shale)		<u>49 886</u>		<u>6</u>	<u>1 000</u>	<u>\$187 072</u>
Industrial Sand						
Nova Scotia Sand & Gravel Ltd.	Nine Mile River	132 269	112 268	5	680	\$3 306 700
Peat Moss						
Annapolis Valley Peat Moss Company	Berwick	10 000		50		\$1 330 000

OFFICES OF THE DEPARTMENT

The Department of Mines and Energy maintains four offices in the Province at Halifax (headquarters), Stellarton, Glace Bay and Springhill. The addresses, phone numbers, and functions they perform are listed here.

HALIFAX

1690 Hollis Street
429-8091, 4161, 4162

all divisions and functions

STELLARTON

32 Bridge Avenue
752-8430

Mineral Resources Division
(resource geology)
Energy Resources Division
(coal exploration)
Engineering Division
(drilling, mechanical work;
mine inspection)

GLACE BAY

Chernin Building
10 Commercial Street
849-7500

Engineering Division
(first aid; mine inspection)

SPRINGHILL

29 Main Street
597-3963

Engineering Division
(mine inspection)

